ELECTRICAL REVIEW

ILLUSTRATED.

A WEEKLY JOURNAL OF

Electric Light, Power, Telephone, Telegraph and Scientific Progress.

VOL. 2C. No. 9 WEEKLY. | NEW YORK, SATURDAY, APRIL 23, 1892. | $3 per Annum. Single Copies, 10 Cents.

Copyright, 1892, by ELECTRICAL REVIEW PUBLISHING COMPANY, 13 Park Row, New York.

Entered at Post Office. New York, as Mail Matter of the Second Class.

VIEWS, NEWS AND INTERVIEWS.

The membership of the British Institution of Electrical Engineers on January 31, 1892, is represented by these figures:

Honorary members	2
Foreign members	177
Members	535
Associates	1,079
Students	183
Total	1,976

The honorary members are Mr. Jacob Brett, of London, and Senateur Adolphe Cochery, of Paris.

A new private dining room has been fitted up by the Manhattan Athletic Club of this city. The electric lighting effects will be very beautiful, and will be installed by Mr. C. L. Hammond, the electrician of the club.

A teacher of natural philosophy once asked the bright boy of the class how many kinds of force there were, and was astonished to receive the following reply: "Three, ma'am. Mental force, physical force and police force."—*Exchange.*

The Fire Commissioners of Cincinnati are experimenting with an electrical signaling device by which the hoseman can signal the engineer when to stop and start his pumps at a fire.

The 54,000 candle-power corona of arc lights around the torch of the Liberty statue in New York bay, is to be replaced by one of 100,000 candle-power.

Electricity, the telephone and modern inventions are entering largely into the most modern schools of medicine and pushing the old schools aside. Pretty soon physicians will follow Macbeth's advice and "throw physic to the dogs." Instead of treating symptoms, they will eradicate causes.—*Los Angeles, Cal., Times.*

While attempting to light his pipe at an electric arc light, as he was told to do in a joke by a fellow workman, a Hungarian at Johnstown, Pa., was instantly killed last week.

The Atlanta *Constitution* predicts that the time will arrive when every farmer in the South will be in communication with all of his neighbors by means of the telephone, and by the same mechanism will enjoy a far more convenient association—vocal, at least—with distant cities than he now has with the employés in his stables or even with the servants in his kitchen.

A Parisian claims to have succeeded in forcing the growth of violets by electricity.

"I come across some curious things in my travels," said an electric light salesman. "I went to a down-town restaurant in New York the other day to sell the proprietor some fan motors. This was Wednesday morning at 10 o'clock. The proprietor made an appointment with me for noon of the following day, when he said he would buy. When I arrived at the place on Thursday noon I found everything sold out to a new proprietor, and no one knew where my man could be found."

An electric elevated railway is to be established at Kansas City, Kan., the elevated railway company having been granted an ordinance permitting it to operate its line by electricity instead of steam.

A Simple Magnetic Indicator.

BY PROF. W. M. STINE, PHYSICAL AND ELECTRICAL DEPARTMENT OHIO UNIVERSITY.

Those having charge of dynamos would often like to know the distribution of the external lines of force in their machines, and much useful knowledge could be obtained in this way. If a magnetic needle is used, it is very apt to change its polarity; it can only indicate in one plane; and in no case can it present a complete picture to the eye. Iron filings, when sprinkled on glass or paper, give a more complete and satisfactory picture, but the use of filings is not only limited to horizontal positions, but they may be drawn into the dynamo and make serious trouble.

It occurred to the writer, while looking at the excellent maps in Carl Hering's "Dynamo, Electric Machinery," that these could have been more accurately drawn had iron filings, at least, supplemented the magnetic needle. With this in mind, an indicator was prepared by placing about half an ounce of filings in a mortar and grinding them as fine as possible, and then placing them in a four-ounce flat bottle, filled with concentrated glycerine. The high viscosity and specific gravity of the glycerine hold the filings in suspension and when the bottle is brought near the dynamo the lines of force appear very clearly. Since they are shown in three-dimensional space, they appear as they really are in space. When the bottle is held near the head of a bolt or sharp projection on the frame, the magnetic discharging power of a point or edge becomes quite apparent. These projections are defects which still exist in many dynamos.

If the bottle is passed along a field coil, in many cases it will show that lines of force pass out thickly from a section of the winding and return a few inches farther along the coil. The relative intensity of the leakage can, at the same time, be seen. These are only a few of the many interesting facts which this simple indicator reveals, and other applications can be readily suggested. It is advisable to use a large flat bottle of clear glass in order to obtain the best results.

Athens, O., April 9.

The Microphone as a Life Saver.

The value of the microphone in the detection of sounds too feeble to be heard by the unaided human ear was recently put to good use in saving a life in St. Petersburg. It appears that a lady who had been suffering from a violent nervous attack sank in a state of syncope, and after a time ceased, as it seemed, to breathe. The doctor who was attending her certified that death had resulted from paralysis of the heart.

For some reason, which was not explained, another medical man saw the body, and, having been informed that the lady had suffered from hysteria and catalepsy, thought it worth while to make a thorough examination. After trying various other means, he applied a microphone to the region of the heart, and was enabled by this instrument to hear a faint beating, which proved that life was not extinct. Everything was done to resuscitate the patient, who shortly afterwards recovered consciousness.

THE UNITED STATES PATENT OFFICE.—ROOM OF J. W. BABSON, EDITOR OF THE PATENT OFFICE GAZETTE.

MOVING TIME.

In accordance with our annual custom we shall be glad to publish announcements of the removals of those of our friends who expect to make changes in locations on or about May 1. Send us your old and new addresses soon as you have decided upon your new quarters and we will chronicle the change in our issue for May 7. Copy of this character should reach the ELECTRICAL REVIEW office not later than May 1.

UNITED STATES PATENT OFFICE.

How the Business of the Most Prosperous of the Government Departments is Carried On.

FURTHER FACTS AND FIGURES SHOWING THE CROWDED CONDITION OF THE PATENT OFFICE.

BY GEO. C. MAYNARD.

II.

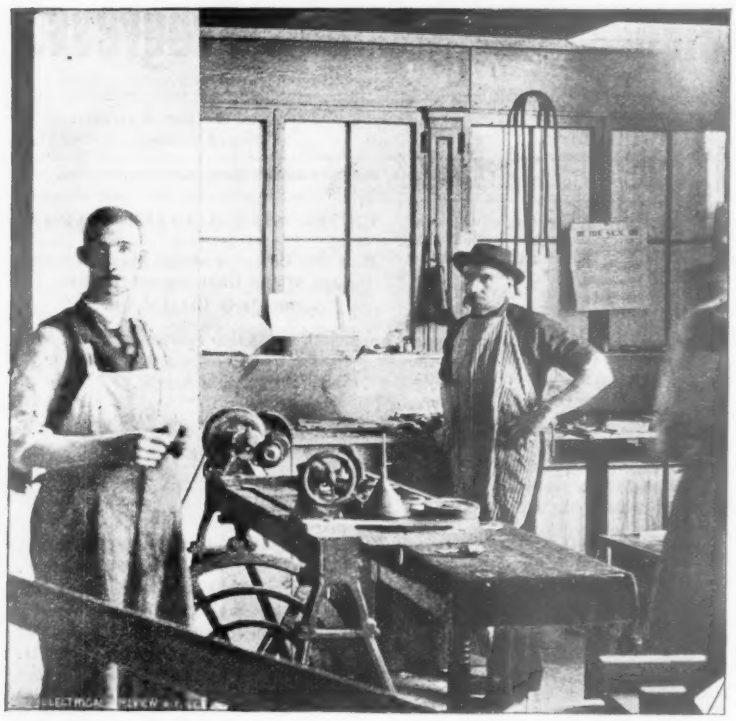
The Issue and Gazette Division of the Patent Office is one with which the multitude of inventors and their representatives have more direct dealings than any other in the bureau, and its chief officer, Mr. John W. Babson, is one of the best known men in the office. He has been prominent in the government service for more than 30 years, and has held his present position since 1876. He has a force of 40 employés, occupying five ordinary size rooms, and half a dozen more at work in store rooms in the basement.

A few years ago the division occupied much less desirable quarters, but Babson got up early one morning, just as a portion of the Indian Office was emigrating from the building, and moved his furniture into the rooms thus vacated, while the other officials were eating their breakfast. So far as room goes, there is nothing to complain of, and the work goes on expeditiously. For an ideal editor's sanctum Mr. Babson's office cannot be regarded as a model. His desk stands before an open door which everybody is welcome to enter, and there are constant calls from inventors anxiously waiting for their patents to be issued. Many of them take occasion to confidentially explain the merits and value of their inventions. Every patent allowed by the examiners goes to the Issue Division and they are received there at the rate of from 100 to 160 per day. They are at once critically examined to determine whether, after the many amendments and alterations which they undergo, they are correct and complete in all matters of form, and in proper condition for the printer. When these questions are settled the inventor or his attorney is notified that his patent has been granted, and he is requested to pay the final fee of $15. The office usually has 5,000 allowed patents on hand, and of this number about 10 per cent. are forfeited. As soon as the fee is paid the patent is dated, numbered, printed and delivered to the inventor. The printing is done with the utmost care, and proof-reading has been reduced to science. Every reference mark in the drawing must exactly agree with the description in the specifications, and the claims are scrutinized until an error is next to impossible. The government receives, in regular fees, $35 for each patent issued. Out of this sum, after the entire expense of running the office is paid, there is left a clear profit of over six dollars. And still stands the interrogation, "*Why cannot inventors get the service they pay for?*" The publication of the *Gazette* affords an example of rapid and correct work. Every Saturday noon all matter is made up to date and sent to the printer, the paper goes to press the same afternoon, is finished and delivered Monday and mailed on Tuesday. The printing of all specifications is done under the supervision

of this division. Whatever delays an application may meet on its way through the examining divisions, it finds smooth sailing when it reaches this office.

THE MODEL HALLS.

This section of the office, after many years of rapid advance, during which it had become one of the most interesting and valuable institutions in Washington, has spent the last 10 years in marching backwards. The entire upper story of the building, with three tiers of galleries, was designed and originally used for the exhibition of models of patented inventions, conveniently arranged in classes for inspection and study by inventors and other interested persons. Every industry and art was represented, and the collection was not only of incalculable benefit to inventors but was of great value to the public as an educational exhibition. Then began the era of encroachment. On two sides of the building the model cases have been moved out into the passages, and the space utilized for some of the examining divisions by boarding off temporary rooms. One entire side (one-quarter of the model halls) has been



ONE OF THE TEN WORKSHOPS IN THE MODEL HALL OF THE PATENT OFFICE.

J. S. BENNETT, CHIEF CLERK OF THE PATENT OFFICE.

taken for the files of patent specifications and for the use of a large section of the Land Office. The Patent Office library, which formerly occupied good front rooms now belonging to the Land Office, is also quartered in the model room. The Census Office has possession of a large hall, which, according to the Patent Office rule of crowding its employés, would accommodate 50 clerks, and is using it for storing schedules. Ten years ago the Commissioner of Patents was compelled to stop the receipt of models. This action has resulted in a calamity which cannot be overestimated. The losses of inventors and the unnecessary expenses paid by them, which a complete set of models would have saved, amount to a very large sum. Many of the model cases are so closely crowded together that the doors cannot be opened, and an examination of their contents is impossible. The superintendent once had a workshop in which models could be repaired, but was obliged to abandon it. Some years since he was turned out of his office, and is now located in a narrow public passage. The department, in making preparations for its exhibit at the World's Columbian Exposition, has 12 mechanicians at work cleaning and repairing models, and these workmen are scattered about the model halls in passages and corners, without power machinery or any conveniences for doing the work expeditiously or economically. In order to avoid making the Chicago exhibit appear as a "back number," the government is appealing to private manufactories and others to supply the models required to bring it down to date.

In the location of the examining divisions no system has been followed. A very considerable number are on the basement floor, three or four are on the main floor and the rest are in the model halls.

Adjoining the room of Electrical Examiner Seely is the division of A. P. Sanders, devoted to the examination of applications for patents relating to bicycles, railway cars, wagons, roller skates, etc.; trucks for the new electric cars furnish a large number of applications. During the last six months not less than 200 applications for pneumatic bicycle tires have been received. Sanders' room is the same size as Seely's, and is occupied by eight persons.

The dean of the examining corps is A. G. Wilkinson, who is at the head of what might be called the Connecticut Division. Builders' hardware is the comprehensive title that covers the numberless ingenious inventions relating to the subject, the largest part of which comes from that State. Every description of surgical appliances also goes to this division. Twenty years ago the division received an average of 40 applications per month and had a force of six examiners. Now it receives about 150 applications per month and has eight examiners. It is impossible for the work to be done promptly with the very inadequate facilities. All the employés are in one room, which has the usual arrangement of wall-cases reaching to the ceiling and desks and chairs massed together. The heating apparatus is 12 years old and very defective. Occasional cessation of business is found necessary, when all the employés leave the room in order that it may be ventilated.

WALTER JOHNSON, EXAMINER OF INTERFERENCES.

T. W. LORD, CHIEF OF ASSIGNMENT DIVISION.

Dr. James B. Littlewood and his seven assistants in the chemistry division are probably expected to supply themselves with

H. P. SANDERS, PRINCIPAL EXAMINER RAILWAY CARS, ETC.

R. C. GILL, SUPERINTENDENT OF MODELS.

are built on the same order. The range of subjects scheduled under the head of chemistry is as remarkable as the appearance of the room in which they are considered. Smokeless powder and powder that does smoke, dynamite and all its explosive relations, fertilizers, dyestuffs, bleaching material and processes, sewage and all appliances used in connection with it, medicines of every description, preservation of fruits and all other foods, photography in all its branches, and the manufacture of sugar and salt, are some of the subjects on which many inventors are at work who send their applications to this division. Besides the regular work of the division, it is expected to test the ink used in the Interior Department and attend to numerous incidental duties requiring the services of expert chemists. Down in the cellar of the building there is an alleged laboratory, but for want of funds to buy apparatus and materials, it is practically useless, and all the chemical experiments of Dr. Littlewood's division are made on the desks of the examiners.

The Division of Metallurgy, Eugene A. Byrnes, principal examiner, is favored with two rooms. The one occupied by Mr. Byrnes and three clerks is ten feet wide. Each of the occupants has a chair to sit in and there is one additional chair for a visitor. When other callers are present at the same time, two of them can sit on the window ledge, provided a lot of tin cases full of applications, which are kept there, are first placed on the floor. The other room is twice the size of the first and has desks for six persons. A case of drawings and the wardrobe have overflowed into the hall. This division is of special interest to electricians, for the reason that it has charge of all matters relating to electrical furnaces, annealing and tempering, separation of ores and the reduction of aluminum. A few days since Examiner Byrnes had an aluminum interference hearing in which seven inventors and 15 attorneys were engaged. After much search-

GALLERY IN THE MODEL HALL OF THE PATENT OFFICE OVERLOADED WITH SPECIFICATIONS

Washington Gladden's bricks of condensed air before they go on duty. At any rate, the room in which they work has a smaller allowance of fresh air than any in the office. It certainly has a remarkable allowance of furniture. The revolving bookcase, which serves as a background for the young lady's portrait, is 12 feet high and the other cases

ing, a small room in another part of the building was found and fitted up with borrowed furniture for the hearing.

Mr. F. A. Seely, one of the best all-round men in the office, is on the upper floor. His division deals with instruments of precision, acoustics and optics. Nine persons are engaged on the work of this division, and enjoy the convenience of a room 21 feet into the public hall of the model room where visitors may look over the examiner's shoulders and study his drawings.

Examiner James Q. Rice has ingeniously followed the example of the starving sailor who tried to make his one loaf of bread go farther by cutting it into two pieces. In this case Rice took a small slice for himself and shared it with his typewriter and phonograph

THE CHEMISTRY DIVISION OF THE PATENT OFFICE.

wide by 25 feet long. Solid walls of high cases, desks placed as closely as it is possible to get them, a rattling typewriter in the center, papers and books in constant use, piled everywhere, are the noticeable features of this division. There is, doubtless, precision in the work of the examiners, but in their surroundings disorder and confusion are clearly evident.

Examiner L. W. Maxson has a great variety of classes under the title of metal bending, metal working, etc., including the prolific subject of nickel-in-the-slot machines. By placing part of his cases in the hall and

F. A. SEELY, PRINCIPAL EXAMINER ACOUSTICS, ETC.

A. G. WILKINSON, PRINCIPAL EXAMINER SAFES, HARDWARE, ETC.

storing several boxes of records elsewhere, he manages to keep the work of his six assistants in one room well in hand.

Examiner C. G. Gould has nine employés in one room with the usual massing of cases, desks, papers, etc. Brushing, grinding and polishing embrace many classes of inventions passed upon in this division.

The manufacturer of paper, bread, crackers, brick, glass, etc., are some of the subjects which bring many applications to Division 15, of which T. J. Hudson is the principal examiner. He has seven assistants, and just about half room enough for convenient work.

Mr. F. C. Skinner, whose division has an incongruous assortment of games, toys and harvesting machines, has space enough but the room is badly lighted and heated. Eight persons constitute the working force, which is unable to keep the work up to the demands of applicants.

Fine arts, music, stationery, bookbinding, etc., belong to the division of Examiner William Burke. These call for an immense amount of work, which is done by eight persons. The room occupied by the division is somewhat larger that many of the others, being 21x34 feet, but it is so overcrowded that a part of the cases have been moved out clerk. In the larger part of the room there are nine desks occupied by busy men. The business of the division is the examination of applications pertaining to printing presses, and the numerous other machines used in printing, typesetting, etc. The work of the division is very heavy. Mr. Rice is the special agent of the Patent Office and the chairman of its committee on the World's Columbian Exposition. Arrangements are being made to exhibit at Chicago a full line of models to show the development in each art represented in the office. Original models filed with patent applications will be used so far as they can be obtained, and private parties have been asked to contribute others to complete the exhibit. Mr. Rice has the promise of a model of the original Gutenberg press, the Franklin press, and a working model of the newest and largest Hoe press.

(To be Continued.)

A New Electric Company in Denver.

The Denver Electric Company has been organized at Denver, Colo. The company is in the market for electrical machinery and solicits bids from manufacturers.

Electricity and Fires.

The *Boston Commercial Bulletin* truthfully remarks as follows:

The electric wire is very often blamed for the origination of fires and undoubtedly many times unjustly. As a matter of fact, statistics for four years by the statements of Boston's fire commissioners, show that the total number of fires in that time were 3,396, out of which 83 or 2.4 per cent. were caused

C. G. GOULD, PRINCIPAL EXAMINER POLISHING, ETC.

L. W. MAXSON, PRINCIPAL EXAMINER METAL BENDING, ETC.

by rats and matches and 273 or 8.1 per cent. from matches in connection with men and children; 148 or 4.3 per cent. from overheated stoves; 79 or 2.4 per cent. from pipes and cigar stumps; 317 or 9.3 per cent. from kerosene lamps; 104 or 3.1 per cent. from fire crackers; 109 or 3.2 per cent. from gas jets; 135 or 3.9 per cent. from bonfires, and 56 or 1.6 per cent. from electric wires.

The New York Electric Club.

Interest in the New York Electric Club has been at a high pitch during the past two or three weeks. It has been known for some time that the finances of the Club were not in

EUGENE A. BYRNES, PRINCIPAL EXAMINER METALLURGY.

DR. J. B. LITTLEWOOD, PRINCIPAL EXAMINER CHEMISTRY.

the best possible shape, and that at the annual meeting for the nomination of officers, held on Thursday evening, April 7, it was expected that a frank statement would be made by the board of managers. President Insull, in a short address to the members present, affirmed the reports sent out in previous circulars, that the Club was in debt and would require either the speedy and unanimous support of the members or the complete wind-up of its affairs. Owing to the small attendance on that evening, it was decided to postpone the question of dissolving the Club until Monday evening, April 11. Another meeting was held at this time, a slightly larger attendance being present. After considerable discussion of the matter, a subscription list was started and $2,000 was raised on the spot. A large committee was appointed to solicit further subscriptions during the week, and to report

T. J. HUDSON, PRINCIPAL EXAMINER PAPER, GLASS, ETC.

F. C. SKINNER, PRINCIPAL EXAMINER HARVESTERS, ETC.

at another meeting to be held on Monday evening, April 18. From the enthusiasm shown it was evident to the board of managers and to all present that a sufficient amount would be raised to pay off the indebtedness of the Club and put it on its feet. It was shown that the present quarters of the Club were too expensive in proportion to the income, and that less luxurious accommodations would have to be secured. The resolution as to whether or not to wind up the Club was laid on the table. At a meeting of the board of managers, held last week, a committee was appointed to look up and report upon the question of cheaper quarters for the Club.

At the annual meeting for the nomination of officers and board of managers for the ensuing year, the present incumbents were renominated as a whole, no opposition ticket appearing in the field. The annual meeting for the election of officers and board of managers will be held Thursday evening, April 21.

If a sufficient amount of money is raised to enable the Club to go on, it seems probable that the present officers will continue to serve the Club. The prospects for the continuance of the Club are much better than they were two weeks ago, and everyone is hopeful that the present financial tangle may be straightened out, and the Club carried on to fulfill its intended purpose.

JAMES Q. RICE, PRINCIPAL EXAMINER PRINTING, ETC.

WILLIAM BURKE, PRINCIPAL EXAMINER FINE ARTS, ETC.

Electric Fog Dissipator.

Of the claim of Mr. M. E. Johnson, of Pittsburgh, that he is interested in an electrical process for the clearing away of dense fogs from the course of a vessel at sea, the details of which he withholds until he can take out a patent, Prof. H. A. Rowland, of Johns Hopkins University, says: "It is a well known principle that an electrical discharge will dissipate a fog, and no patent could be obtained on the mere application of the principle. It is a very common laboratory experiment to make a fog or mist in a glass vessel, and, by sending electricity from a point into it, to dissipate the mist. As soon as the electrical discharge strikes into the fog, the glass instantly clears. Though this is a very common experiment in physics, I hardly think it would be possible to make it applicable in a commercial way; that would hardly be practicable. However, never having seen the experiment tried, except on a small scale in a laboratory, I am not able to say what might be the result with greater opportunities, although it does not seem to me possible to drive a fog away before a ship at sea. Any one who has been to sea on a fast moving steamship would naturally doubt the possibility of making a practical application of any device to dissipate a thick marine fog."

THE ASSIGNMENT DIVISION OF THE PATENT OFFICE. CLERKS AND TYPEWRITERS MAKING ABSTRACTS OF TITLES.

Judge Coxe's Decision in the Storage Battery Case.

TO THE EDITOR OF ELECTRICAL REVIEW:

The newspapers have in the last few days been made the vehicle for conveying to the public the idea that Judge Coxe, of the United States Circuit Court for the Southern District of New York, had, in the case of the Accumulator Company against the New York and Harlem Railroad Company, awarded to one J. W. Swan and his assignees the sole and exclusive right to a perforated support plate for storage batteries; that without such a plate as Swan claims no practical storage battery had ever been made, and that this decision postpones indefinitely the use of storage battery cars and the like.

We cannot better show how misleading these statements are than to quote from the decision itself. Judge Coxe says:

"The original patent, No. 312,599, dated February 17, 1885, was considered by this court in the case of the Accumulator Company *vs.* Julien Company, 38 Fed. Rep. 117. The original was held invalid (page 140–142) for the reason that it described and claimed a plate, the outer surface of which might be covered by the active material. This construction, in view of the work done by Professor Eaton, was held to be anticipated.

"The theory of the reissue is that the valuable feature contributed by Swan consists in confining the active material to the holes, without permitting it to extend beyond them to the surface of the plate. That portion of the original which refers to the coating of the outer surface of the plate has been omitted in the reissue. In other respects the description is unchanged.

"The claim is as follows:

"A perforated or cellular plate for secondary batteries, having the perforations or cells extending through the plate and the active materials or material to become active packed in the said perforations or cells only, substantially as described.

"This is the claim of the original, except that the word 'only' has been added."

The patent cannot be criticised as a reissue. The claim instead of being broadened is greatly restricted. The application was filed within a reasonable time after the inventor was informed of the facts which made a narrower claim necessary. The facts bring the case within the provisions of Section 4916, of the Revised Statutes.

"The field of invention is, *concededly, a narrow one.*

"The counsel for the defendant correctly states that Swan's improvement consists 'wholly in the idea of putting on the surface of a perforated plate for secondary batteries no active material beyond the contents of the perforations; everything, except this, is conceded to be old.'

"The date, *de jure*, of Swan's invention is January 18, 1882. Prior to that time Prof. Eaton had filled the perforations, but he had covered both sides of his plate as well. Mr. Brush had rammed or pressed absorptive substances, in the form of dry powder, into grooves or receptacles without covering the surface of the plate. No one had packed active material into holes extending through the plate, confining it entirely to these holes. This combination was original with Swan."

Swan was not the inventor of the perforated plate. On the contrary, Judge Coxe took that claim away from him in the case of The Electrical Accumulator Company *vs.* Julien, and gave the broad claim to Brush in the case of The Brush Electric Company against The Electrical Accumulator Company.

Neither has Swan the right to put active material in the perforations, or apply it in any way to a perforated plate, for that has been awarded to Brush.

His claim is the narrow one of putting the active material in the perforations only. His claim does not cover the method of putting the active material in the perforations and at the same time spreading it over the surface of the plate. Neither does it cover the putting the active material in any manner in grooves, receptacles, or perforations that do not extend wholly through the plate. In fact, the claim is as narrow as it is of doubtful utility. The progress of the storage battery industry will not be retarded one hour by the decision.

THE CONSOLIDATED ELECTRIC STORAGE BATTERY COMPANY.
By WM. BRACKEN, President.
New York, April 12.

Judge Coxe filed an order, April 13, in the United States Circuit Court, in the suit of the Accumulator Company against the New York and Harlem Railroad Company, in which the New York and Harlem Company is perpetually enjoined from using the batteries.

The Annual Report of the Thomson-Houston Electric Company.

The annual meeting of the stockholders of the Thomson-Houston Electric Company was held at Middletown, Conn., Monday, April 11. A board of directors for the ensuing year was elected as follows:

H. A. Pevear, C. A. Coffin, J. N. Smith, B. F. Spinney, Chas. H. Newhall, S. A. Barton, Eugene Griffin, S. E. Peabody, and T. J. Coolidge, Jr., all of Boston.

Mr. Coffin made an introductory statement calling attention to the general depression during 1891. He said that the business of the company fell off 30 per cent. during the first half of the year, but that this was more than made up during the last half. On February 1, 1892, the orders on hand were double those at the same date in 1891.

Local companies using the Thomson-Houston systems:

	No. of Cos.	No. of Arc Lamps	Incan. Lamps
January 1, 1883	5	365	
" 1, 1884	31	2,478	
" 1, 1885	59	5,867	
" 1, 1886	100	13,227	
" 1, 1887	171	21,840	11,275
" 1, 1888	303	36,936	59,330
" 1, 1889	419	51,621	120,380
" 1, 1890	587	68,203	281,555
" 1, 1891	755	87,131	616,355
" 1, 1892	873	100,293	806,500

The balance sheets as of January 30, 1892 and 1891, compare as follows:

ASSETS.

	1892.		1891.
Accounts receivable (*a*) (90%)	$5,941,164	(90%)	$5,854,606
Notes receivable (*b*) (92½%)	1,514,040	(95%)	1,665,159
Real estate (70%)	430,241	(70%)	350,009
Machinery and tools (60%)	491,045	(70%)	400,000
Patterns and models	135,000		135,000
Patents (*d*)	338,354		338,354
Local Company's stocks (*e*) (35%)	473,587	(40%)	346,430
Local Company's bonds (*f*) (70%)	1,858,570	(70%)	1,646,120
Manufacturing Company's stock (*g*)	3,729,196		3,821,018
Construction Company's stock (*g*)	1,210,750		1,022,500
United Securities Company's stock	525,420		487,425
Inventory (*h*)	1,856,688		1,530,144
Consignments	32,117		14,096
Cash	1,727,276		632,055
	$20,263,448		$18,242,907
Common stock not del'd and prem. on same.	....		662,200
	$20,263,448		$18,905,107

LIABILITIES.

Capital stock (common)	$6,000,000	$6,000,000
Capital stock (preferred)	4,000,000	4,000,000
Accounts payable (merchandise)	498,808	374,341
Notes payable (collateral)	1,429,486	1,537,357
Notes payable (plain)	587,005	769,675
Mortgage	1,200	1,200
Guarantee account	200,000	200,000
Surplus from previous year	6,022,534	1,685,416
Profits for year	2,760,781	3,091,884
Premium on stock sold	....	1,500,000
	$21,499,814	$19,159,873
Less dividends	1,236,366	254,766
	$20,263,448	$18,905,107

STATEMENT OF SURPLUS ACCOUNT.

Surplus February 1, 1891	$6,022,533.71
Income for year ending January 30, 1892, after deducting dividends paid during the year	1,524,414.25
Surplus January 30, 1892	$7,546,947.96

Railway companies using the Thomson-Houston system:

	No. of Cos.	No. of Cars	Miles of Track
January 1, 1890	92	701	420.29
" 1, 1891	145	1,532	1,159.81
" 1, 1892	204	2,769	2,363.63

We compare above the balance sheet with that of a year ago, as follows, percentages given being the per cent. of actual cost at which items are entered in the balance sheet in the case of real estate, machinery and tools, and the per cent. of face or par value in other cases.

The liabilities, as shown in the statement, do not include $500,000 Thomson-Houston Collateral Trust Bonds, which were issued in 1889 as an accommodation to the Manhattan Electric Company, of New York. The Manhattan Company, besides assuming the entire burden of paying the principal and interest of these bonds, supplied the Thomson-Houston Company, without cost to it, with ample collateral security for the same.

The Thomson-Houston Electric Company has received from its stockholders from time to time, $10,500,000 in actual cash from subscriptions to its common and preferred stock. The last issue of common stock, amounting to $1,500,000 at par, was sold in September, 1890, at 100 per cent. premium, yielding to the treasury $3,000,000 in cash. Thus, $1,500,000 of the surplus of the company on February 1, 1891 ($6,022,533.71), is represented by premium received from the sale of common stock; the balance by accrued surplus earnings of the company.

The surplus net earnings for the fiscal year just closed, after deducting $1,236,366 paid during the year as dividends on common and preferred stock, is $1,524,414.25, making the total surplus, February 1, 1892, $7,546,947.96.

Prior to March 1, 1892, there had been paid to the stockholders in cash dividends a total of $1,731,131.88. In addition to this, there had been distributed among the stockholders as a special dividend $1,000,000 of common stock at par, which was taken from the surplus account of the company April 15, 1889, and securities of the par value of $2,416,468.27 were placed in the hands of trustees for the benefit of the stockholders of the company October 5, 1889.

There has also been sold to trustees, for the further benefit of stockholders of the parent company, stocks and bonds of local companies, classed as Thomson-Houston securities, series "A," "B" and "C," from which the shareholders have realized as profit, in excess of cost to them, an amount which, added to the present market value of the shares, would aggregate $775,000.

In explanation of the deductions made from the assets of the company, it may be stated that, following the conservative policy that has always prevailed, allowances have been made with an idea of placing upon each and every asset a value which will be safe in any contingency.

(*a*) From accounts receivable, the same deduction has been made as in former years. This has in previous years always been found ample.

(*b*) The deduction of 7½ per cent. from notes receivable is 2½ per cent. in excess of the rate deducted in former years, and is regarded as more than a sufficient guarantee for contingencies.

(*c*) Following the precedent of last year, the expense incurred for office furniture and fixtures during the year has been charged to expense account.

(*d*) While a large sum has been expended during the past year in the acquisition of patents, this has all been charged to current expense instead of adding to the patent account.

(*e*) In local companies' stocks a deduction of 65 per cent. is made, which is five per cent. in excess of deductions in former years. More than $200,000 of stocks and bonds of railway and lighting companies at par value are carried in a separate account as of doubtful, though of considerable prospective value, and do not appear in the inventory at all.

(*f*) These bonds are nearly all payable in gold, and are amply secured by sinking funds and other protective provisions, made under the supervision of competent attorneys of our own selection. A large profit should be realized from the sale of these bonds.

(*g*) The manufacturing and construction companies' stocks are taken at their cost value. The companies represented by these stocks are making very satisfactory earnings and working in harmony with the Thomson-Houston Company, thereby contributing largely to the success of this company.

(*h*) The inventory of merchandise and material at the factory has been taken in the usual way, *at less than actual cost.*

The Gulcher and Pintsch Thermopile.

Twelve or more blocks of copper are arranged radially round a center, forming a tube, through which the flame of a Bunsen burner passes. To the back of each of these pieces of copper (which are insulated from each other) are connected the ends of plates of antimony-zinc alloy and nickel; the former being cast onto the copper, and the latter brazed. The outer end of the nickel is connected to the outer end of the antimony of the next couple, and so on round the ring; the series being—Cold Sb-Ni, hot Ni-Cu, hot Cu-Sb, cold Sb-Ni, etc. Large copper plates are attached to the cold junctions to facilitate radiation. Several of the rings thus built up are placed one over the other, separated by asbestos, which is the insulating material used throughout; the flame of the burner passing through the tube thus formed. The whole is in an outer case, through which a draught of air is induced by joining it to the outlet of the central tube into the chimney. —*La Lumiere Electrique.*

OBITUARY.

The board of directors of the City of Pekin, Ill., Electric Light and Power Company have passed appropriate resolutions upon the death of Mr. Andrew Irvine, who was an agent for the National Electric Manufacturing Company, of Eau Claire, Wis.

Frederick Willard Baldwin, general wire chief of the Western Union Telegraph Company, died at his home, 369 East 135th street, this city, shortly after noon April 12th. He had been suffering a long time, his illness dating back to the fire at the Western Union building, July 18, 1890. Mr. Baldwin was born in Weedsport, November 21, 1852. At the age of 13 he became a messenger boy, and for three years was employed in telegraph offices along the line of the New York Central road. After that he came to New York and entered the Western Union service as an operator. He advanced steadily until about ten years ago, when he was made chief over all the wires. Mr. Baldwin had a marvelous memory and an active mind. He was familiar with the details of the work of a dozen subordinates, each of whom had all he could do to keep up with his own endless work. After the fire, when the operating room was destroyed, and nothing remained of countless wires but a mass of black stumps, the wire chief's knowledge of the wires did more than anything else to restore order out of chaos. He knew every wire and every circuit, and within 48 hours the big system was buzzing and ticking as busily as ever. But the great strain and exposure undermined his constitution. He caught cold, which developed into pneumonia and subsequent consumption. The company sent him to Lakewood, and afterward to Florida, but he returned to New York a few months ago to die. He leaves a wife and three children. His wife, who was a Miss Wright, was formerly a telegraph operator, and their courtship began amid the ticking of hundreds of keys. Mr. Baldwin was a member of all the telegrapher's clubs and societies.

Funeral services over the remains of Rudolph Maher, who died at Cleveland, O., February 18, were held in Roxbury, Mass., last week. Mr. Maher was superintendent of the Brush Company's factories.

Dewey's Electric Railway System.

The following particulars furnished to the REVIEW of a new electric railway system, invented by M. W. Dewey, will prove of general interest. It is stated that the system will shortly be put into practical use. Some of our cities will not now allow electric railways in their streets having the overhead construction on account of its being unsightly and obstructive, and it does not seem too much to say that, should a system without these objections appear, all of our larger cities, at least, would prefer it and refuse the overhead construction. The public would welcome such a system. An electric system, having the desired and above-mentioned advantages, will now be briefly described.

The principle upon which this system

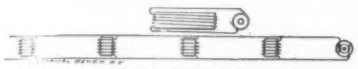


FIG. 1.—DEWEY'S ELECTRIC RAILWAY SYSTEM.

may be founded is that of induction, that is, the current used on the car to propel it can be induced by and be entirely separate from the current generated at the station or power house, and transmitted along the line of travel by the line conductor. In applying this method of induction, use is preferably made of the fact that the presence of a complete or nearly complete magnetic circuit in or around the primary and secondary electric circuits greatly increases the inductive effects of the primary current, as in transformers or converters now in use in alternating current systems of electric lighting. The means by which this method may be carried out consists in constructing the elements of a magnetic circuit or each of a plurality of such circuits in two parts, one of which is stationary and, preferably, embedded in the roadway, and the other of which is carried by the car or cars. The stationary part is energized by a pulsatory or alternating electric current which may be derived from any suitable source, and the induced electric current may be generated in one or more coils surrounding the movable part of the magnetic circuit. The current thus generated may be transmitted directly to one or more suitable motors arranged to drive the car, or it may be commutated or rectified before it is passed to the motors. The movable part of the transformer or converter on the car is continually in inductive relation to one or more of the stationary parts of the transformer or converter. It would seem that the most preferred and effective plan would be to place coils connected with a source of alternating current, and wound upon ⊔ shaped iron cores, equal distances apart, about the length of a car, in the roadbed between the rails. Let the ends of the core be on a level with the pavement or slightly above it. Roughened iron wearing plates may be secured by suitable means to the ends of the cores, so that the cores themselves will not be worn. These plates may be removed when necessary and others substituted. The conductor extending to the coils should be thoroughly insulated and laid underground along the railway. The several cores and coils in the roadbed form one-half of the transformer or induction apparatus, the other half is carried on the cars. Each motor has an inverted ⊔ shaped or straight iron core, upon which one or more secondary coils are wound. The ends of the vehicle core should come above and in proximity to the ends of the roadbed cores. If a complete magnetic circuit is to be maintained by the cores, the vehicle core should be somewhat longer than the distance between the roadbed cores, and iron brushes or wheels should be secured to the ends of the vehicle core to make contact with the stationary cores. By this arrangement almost any amount of energy may be supplied to the car for propelling it and also for lighting and heating it. The magnetic circuits so formed will be as complete as any magnetic circuit of a converter used in lighting systems and will be as effective.

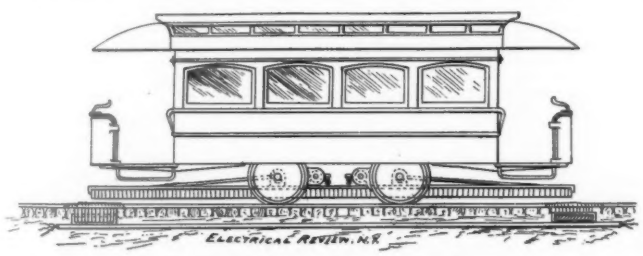


FIG. 2.—DEWEY'S ELECTRIC RAILWAY SYSTEM.

Of course, the cores may be suitably laminated and the windings thereon suited to the currents to be used and the transformation required for the motors on the cars.

The vehicle coil and core may be mounted upon the axles or truck of the vehicle or may be mounted independently upon wheels to travel either on the same rails that the vehicle travels on or on one or more separate rails laid between the others.

It will be seen that this is an electric system having no poles, no span wires, no overhead working conductor, no guard wires, no trolley to run off, no slotted conduit for light vehicle wheels to catch in, and get filled with rubbish, water, snow and ice, no storage battery of several thousand pounds weight on the car to be carried up the grades, nothing that is dangerous or obstructive in the least. Everything is out of sight and reach and thoroughly protected, wires are not in the way in case of a fire, it will be impossible to get a shock by contact with the rails or the iron plates between them; there will be no waste of current by its being short circuited between the rails; water, ice or snow cannot prevent its operation; almost any voltage may be given to the primary current and perfect regulation of the secondary currents guaranteed; the roadbed apparatus is entirely stationary; there are no switches in boxes along the road that must be operated as the car is moved; in fact, there is nothing in its construction but what is positive and substantial.

The first cost of construction of this system may be somewhat greater than that of the overhead plan, but it would be much less than a cable or slotted conduit road and far less expensive to keep in working order.

The entire road need not be equipped with this system unless desired, but only the part or parts passing through the principal streets; the other part may be equipped with the overhead construction, which can be made to work well and in harmony with the proposed system.

The illustrations accompanying this article will help to a clear understanding of the system above described.

Baker's Burglars.

Baker & Company, the well-known platinum refiners, of Newark, N. J., were visited by burglars last week. An attempt was made to blow open the firm's big safe, but it withstood the shock successfully, and the villains were foiled.

Killed by Tasting Electricity.

It is a habit among electrical workmen to test the presence of electrical currents by placing in the mouth the two ends of the wires leading from the cells. The sensitive surface of the tongue instantly makes known the presence of the slightest current. A workman connected with a Berlin establishment, who constantly employed this rough-and-ready means of testing, recently died, and it was found that his death could be distinctly traced to this practice. The soluble salts of copper which had been gradually absorbed into his system had poisoned him.

Polyphase and Telephone Circuits.

During the working of the Lauffen-Frankfort transmission plant, the German postal telegraph authorities carried out a series of experiments with a view of testing the effect upon their lines of circuits carrying polyphase currents. On the first four single wire telephone circuits selected, which varied in length from 1 mile to 3½ miles, and which were at an average distance of 10 metres from the disturbing circuit, a constant humming was heard, which, in wet weather rendered all conversation impossible. Tests were next carried out on two private telephone lines. One of these started at a great distance from the polyphase current wires, and crossed them at a given spot. The other line ran alongside the Lauffen-Frankfort circuit at a distance of from 5 to 15 metres for a little over half a mile. Both lines were rendered useless. On the Heilbronn-Mosbach circuit, 18 miles long, telegraphic communication was exceedingly difficult. On several other telegraph circuits, whenever 25,000 volts were applied to the Lauffen-Frankfort line, the armatures of the electro-magnets kept up a continual vibration. Experiments were also carried out on the Stuttgart-Heilbronn double-wire telephone circuits (7½ miles). With 10,000 to 15,000 volts on the Lauffen line a noise was heard which increased with the voltage applied until, with 25,000 volts on, all conversation was rendered inaudible. The general conclusions to be drawn from these experiments are as follows: 1. The influence of polyphase currents (increasing with the voltage) was felt on lines traversed by telegraphic and telephonic currents and placed at an average distance of 10 metres from the disturbing circuit, for stretches ranging from ½ to 18 miles. 2. Lines merely crossing the Lauffen-Frankfort wires were disturbed as well as complete metallic circuits.—*London Electrician.*

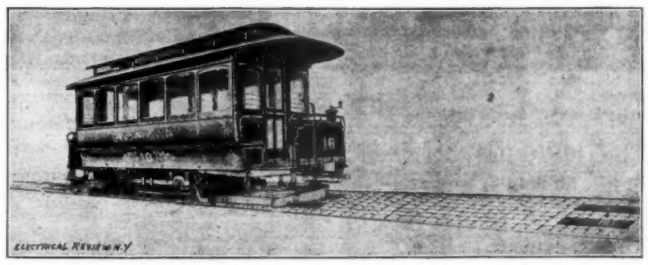


FIG. 3.—DEWEY'S ELECTRIC RAILWAY SYSTEM.

According to Herr Lahmeyer in a paper before the Elektrotechnische Verein, Berlin, February 23, 1892, no serious disturbance is found on the Heilbronn-Lauffen telephone circuits, although mounted on the same cross-arm as the polyphase power circuit and following it for 13 miles. The following is an extract from Herr Lahmeyer's paper:

Meanwhile the Lauffen installation, which furnishes the necessary current for the city of Heilbronn over a line of 12 kilometres, has been in daily use. This line is constructed upon the method of protection against "induction from within" (*i. e.*, induction produced by the conductors themselves). There are two telephone conductors upon the cross-arms carrying the tri-phased current conductors, the distance between them being but .7 m. While calling on me a short time ago Mr. von Miller informed me that the telephones, during the working of the tri-phased current line, were not at all disturbed as long as the weather was clear. It is not necessary to hold the receiver close to the ear, but even at a distance of three inches conversation can be heard distinctly. Writing to the Portland Cement Works, situated at Lauffen, I received the following letter.

MESSRS. W. LAHMEYER & CO.,
FRANKFORT ON THE MAIN.

Gentlemen:

We are glad to corroborate Mr. von Miller's statements, *i. e.*, that our talking circuit to Heilbronn, running for 13 kilometres on the same cross-arm which is used for the power line, is at all times absolutely free from disturbance. For the transmission of power they are using 5,000 volts and 40 amperes, while the distance between the highest conductor serving as the return for the telephone circuit and the middle conductor of the power line amounts to but .6 m., that between the highest telegraph and power conductor being .7 m.

Our telephones were manufactured by Reiner, of Munich. As long as the weather is fair conversation is very distinct, regardless of the working of the power installation, during rain or storm we sometimes perceive noises which, however, do not interfere with the use of our telephone line.

Yours respectfully,
WURTEMB. PORTLAND CEMENT CO.,
DR. AHREND.

Electric Morality.

A writer in the Pittsburgh *Dispatch* says: There is no more enthusiastic advocate for the use of the electric light than the clergyman, and there is a subtler reason than the mere improvement in the quality of light for the wholesale extent to which the modern luminant is being introduced into churches and chapels. A clergyman naturally likes to be listened to, and it is neither flattering to his eloquence nor encouraging to his zeal when an epidemic of sleep seizes upon a large number of his congregation. It speaks well for both ministers and congregations that since the electric light has been used in places of worship congregations are infinitely more attentive and wide-awake than formerly.

This is easily explained. To light a church or chapel brilliantly by gas means also introducing into that church or chapel the most certain cause of headache and malaise. It is necessary to light the gas some time before the service. Occasionally this is done hours before in order to warm the church, the result being an atmosphere which quickly induces a "used up" sensation. The building charged with carbonic acid gas, is a lethal chamber on a large scale, only needing to be hermetically sealed to produce fatal results. The air becomes as potent in its effects as a sleeping draught.

An incident occurred in Scotland not long ago that illustrates in another way the dependence of morals on electricity. A fishmonger of a small Scottish town, who was a zealous attendant at the local Presbyterian chapel, called one day on his minister and entreated him to use his influence with the authorities for the improvement of the telephone service. He said that the service was always worst just at the busiest time of the day, and the constant profanity among the merchants of the town could not fail to do away with much of the good of the pastor's ministrations. The argument was a cogent one, and it is to be hoped that the parson appreciated its practical value and acted accordingly.

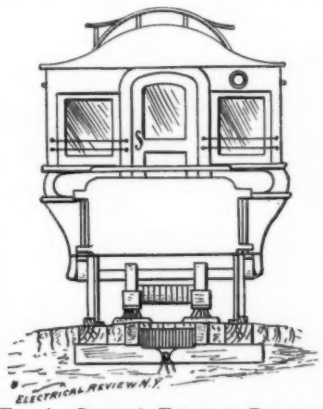


FIG. 4.—DEWEY'S ELECTRIC RAILWAY SYSTEM.

The Erie Telephone Company's sub-companies' increase of net earnings for January and February, over same months last year, was $7,700. Net gain of subscribers for the two months, 109; total number connected March 1, 14,120.

ELECTRICAL REVIEW

Published at 13 Park Row,
P. O. Box 3329. NEW YORK.

EDITOR:
CHARLES W. PRICE.

ASSOCIATE EDITORS:
STEPHEN L. COLES.
ROBERT H. READ.

REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.

"1546 CORTLANDT." TELEPHONE CALL.

BOSTON OFFICE:
W. I. BARKER, Room 29, 620 Atlantic Ave.

WASHINGTON OFFICE:
GEO. C. MAYNARD, 1409 New York Ave.

CHICAGO OFFICE:
MERWIN J. BULKLEY, 435 "The Rookery."

EUROPEAN OFFICE:
CHARLES FFRENCH, Editor for Europe.
HOTEL VICTORIA,
Northumberland Ave., Charing Cross, London, W. C.

Cable Address: - - "Electview," London.
Telegraphic Address: Ffrench, "Victoriola," London.

ADVERTISING DEPARTMENT,
H. T. RICHARDS, Manager.

PATENT BUREAU,
ROBT. H. READ, Manager.
Patents procured in United States and all foreign countries. Searches, investigations and Reports on Validity and Infringement.

SUBSCRIPTION TO THE ELECTRICAL REVIEW.
One Year, United States and Canada, - $3.00
One Year, Foreign Countries, - - 5.00
Single Copy. - - - - - - - .10

ANNOUNCEMENT.
Address all communications and make all money orders and checks payable to order of ELECTRICAL REVIEW, P. O. Box 3329, New York.

No attention will be paid to communications for the REVIEW without the *name and address of the writer.*

NEW YORK, APRIL 23, 1892.

CONTENTS.

	PAGE.
Views, News and Interviews	115
A Simple Magnetic Indicator	115
The Microphone as a Life Saver	115
Moving Time	115
United States Patent Office	115
A New Electric Company in Denver	117
Electricity and Fires	117
The New York Electric Club	117
Electric Fog Dissipator	117
Judge Coxe's Decision in the Storage Battery Case	118
The Annual Report of the Thomson-Houston Electric Company	118
The Gulcher and Pintsch Thermopile	118
Obituary	118
Dewey's Electric Railway System	119
Baker's Burglars	119
Killed by Tasting Electricity	119
Polyphase and Telephone Circuits	119
Electric Morality	119
The Trolley in the National Capital	120
The New York Electric Club	120
Correspondence:	
Our Chicago Letter	121
Our Boston Letter	121
Our San Francisco Letter	121
Death of Mr. A. B. Uline, the Prominent Telephone Man	121
World's Fair Incandescent Lighting	121
Personal	121
Niagara Falls	121
Telephonic ews	122
An Electrical Surgical Instrument	122
The Okonite Cable Arrives at Oakland, Cal.	122
Bernstein's Electric Manufacturing Company's New Type of Motor	122
Dividends	122
Electric Wiremen Strike	122
Electricity and the Looms of St. Etienne, France	123
A New and Noiseless Electric Fan	123
Injunction Dissolved	123
A Fire-Proof Building	123
That Telephone to Mars	123
A License Granted	123
The Telephone in England	123
Telegraphic	123
New Incorporations	123
Electric Power	124
Commutation Rates on the West Shore to be Reduced May 1	124
Philadelphia's Electrical Statistics	124
Western Electric Company's Railway Equipment	124
Literary	124
The International League of Press Clubs	124
The Edison Triple Expansion Engine and Multipolar Generators	125
Electric Light News	125
Kindred Interests	126
The Northwest Thomson-Houston Electric Company	126
Electrical Patents	126

INDEX OF ADVERTISERS.

COVER PAGES.

	PAGE.
American Electrical Works	i
Ansonia Brass & Copper Co.	xx
Armington & Sims	xx
Bridgeport Brass Co.	xx
Brush Electric Co.	xix
"C. & C." Electric Motor Co.	xix
Crocker-Wheeler Motor Co.	i
Day's Kerite Insulated Wires	xx
Eastern Electric Cable Co.	xx
Eastwood, Benj.	i
Eddy Electric Mfg. Co.	i
Gleason Mfg. Co., E. P.	i
Hampson & Co., E. P.	xx
Jewel Belting Co.	xx
Johns Mfg. Co., H. W.	xx
Keasbey, Robert A.	xx
Moore, Alfred F.	xx
Noye Mfg. Co., John T.	xx
Okonite Co.	i & xx
Schuyler Electric Co.	xix
Simplex Electrical Co.	i
Star Electrix Co.	i
Van Nuis, C. S.	i
Wainwright Mfg. Co.	i
Wallace & Sons	i
Waterhouse Bros.	i
Weston Engine Co.	i
Wilmot & Hobbs Mfg. Co.	xx

INSIDE PAGES.

Allentown Foundry & Machine Co.	vii
Allis & Co., Edward P.	x
American Bell Telephone Co.	xviii
American Casualty Insurance and Security Co.	xiv
American Electric Elevator Co.	xiv
American Engine Co.	xi
Baker & Co.	vi
Barnes Co., W. F. & John	vi
Barrett, John A.	126
Benedict & Burnham Mfg. Co.	iii
Bickford & Francis Belting Co	xi
Bishop Gutta Percha Co.	xi
Brill Co., J. G.	xiv
Buckeye Engine Co.	vi
Burton Electric Co.	vii
Central Electric Co.	iii
Church & Sleight	xvii
Cutter Electrical and Mfg. Co.	x
Day's Kerite Wire	xiii
Detroit Electrical Works	ix
Dixon Crucible Co.	v
Douty, H. W.	iv
Dwight Slate Machine Co.	vii
Edison General Electric Co.	xi
Edison-Lalande Battery	v
Electric Construction and Supply Co.	v
Electric Secret Service Co.	xviii
Electro-Light Engraving Co.	vi
Empire China Works	xviii
Eureka Tempered Copper Co.	ix
Evans Friction Cone Co	x
Faraday Carbon Co.	vi
Falls Rivet & Machine Co.	xiv
Fletcher & Fletcher Electric Co.	xvii
Fort Wayne Electric Co	xviii
Garvin Machine Co.	xiv
Globe Co.	vi
Greeley & Co., The E. S.	ix
Haines, Jones & Cadbury Co.	vii
Harrisburg Foundry and Machine Works	xvii
Heisler Electric Co.	iv
Hill Electric Co., W. S.	vi
Holmes, Booth & Haydens	xviii
Independent Bung Co.	ix
Johns Mfg. Co., H. W.	vii
Ladd, Alfred W.	vii
Lane & Bodley Co.	vi
Law Telephone Co.	126
Leclanche Battery Co.	xi
Leffel & Co., James	vii
Lehigh Valley Creosoting Co.	vii
Leonard & Co., H. Ward	xiv
MacKie, Robb	126
Marshall, Wm.	ix
Merchant & Co.	vii
National Electric Mfg. Co.	xv
New England Butt Co.	ix
New York Belting and Packing Co	v
New York Insulated Wire Co.	v
New York & Ohio Co	x
Ostrander & Co., W. R.	vii
Phœnix Glass Co	vii
Phosphor Bronze Smelting Co.	ix
Prentiss Tool & Supply Co.	126
Queen & Co.	ix
Randolph, R. J.	v
Ridlon & Co., Frank	ix
Royce & Marean	vii
Roy Valve Co.	iii
Sawyer-Man Electric Co.	xiv
Short Electric Railway Co.	ix
Solar Carbon & Mfg. Co.	vii
Somoff, J. L.	vi
Standard Paint Co.	vi
Stanley Electric Mfg. Co	xi
Thomson-Houston Electric Co.	xiii
Tyndall, Wm. D.	vi
Waddell-Entz Electric Co.	xvii
Walworth Mfg. Co.	iii
Washburn & Moen Mfg. Co.	vi
Watson & Stillman	ix
Western Electric Co.	ix
Westinghouse Electric & Mfg. Co.	iv
Wheeler Condenser & Engineering Co.	xiv
Wood, Jr., John	v
Woodhouse & Rawson	vii

Professor W. M. Stine's communication on a simple magnetic indicator, published on the first page of this issue, is exceedingly interesting. The device is simple and the results of its use are practical and probably correct.

Our San Francisco correspondent calls attention to the fallacies of municipal ownership by referring to the experience of the cities of Alameda and Berkeley, Cal. In the words of the variety artist: "It's hustle or bust to get the dust to feed the elephant hay."

One of the new exchanges that comes to our desk is *Electrical Progress and Development*, published monthly at Boston. Mr. R. F. Ross, well known in electrical circles as the former editor of *Modern Light and Heat*, is the editor and proprietor. The REVIEW extends its sincere well-wishes to Mr. Ross and trusts that his new journal may enjoy a successful career.

Another installment of Mr. Maynard's article on the needs of the Patent Office is presented in this issue. Attention is called to the crowded condition of affairs which prevents that speedy attention to his needs which the inventor has a right to expect. The illustrations show how true a statement of the case Mr. Maynard makes. Let us hope that something will be done quickly to ameliorate these injustices.

The action of the City Council of St. Etienne, France, in deciding to attempt the experiment of running 18,000 ribbon looms by electricity is novel and commendable. These looms, we understand, are the independent property of the weavers and are located in private houses. The experiment is to continue during two years and if success is attained, the city will buy the electrical plant from the contractors. The report of U. S. Commercial Agent Loomis, covering this matter, appears in this issue.

Governor Flower has signed the Cantor bill incorporating the General Electric Company. In a memorandum the Governor says he signed it because it is claimed that its objects cannot well be secured under existing laws and because its approval will keep within the State a corporation which professes to be ready to invest a large amount of capital, and which, without the concessions allowed by its proposed charter, would be incorporated under the laws of New Jersey. The Governor adds that there is a growing sentiment in favor of less severe restrictions in the corporation laws of the State, to the end that investments of capital may be encouraged within the State.

In these days, and especially in this city, we live too much at a time. Not exactly too fast, but we put 12 hours into six. Medical authorities who realize how this matter is going and knowing that they cannot stop it, have advocated a remedy. The remedy is exercise and fresh air. A half hour a day spent in walking, if no more time can be spared, may save a hard-working man's life. And there is no class of men who work harder than electrical people. They are mostly young men, so that horrible examples of death from overwork are scarce. But the man who drops his work for half an hour a day and breathes fresh air, even for that short time, will do better work and more of it, because he will prolong his life.

Gen. Horace Porter, President of the Grant Monument Association, New York city, is putting new life into the Association, and has arranged a comprehensive and business-like organization on the part of the citizens of New York looking towards the erection of the promised memorial over the grave of the great General. The plan proposed contemplates enlisting in support of this patriotic undertaking every business interest, profession and trade in the city, and many energetic and public-spirited citizens have joined in the work. The corner-stone of the monument will be laid in a few days, and it is now evident that this magnificent structure will soon be erected. Every citizen of New York should give his mite to this cause, and the REVIEW hopes to see the proper recognition of the services of one of the world's greatest heroes soon carried to a proper completion.

Literary people scarcely seem to appreciate the valuable material which electrical science affords those who have an imaginative turn of mind. To be sure, Camille Flammarion and Jules Verne have dipped lightly into this province, but they are Frenchmen. What we want is a breezy, fresh, American story, by an American author, in which the interest is held by the remarkable electrical development of the last decade, or a novel electrical experiment, or something of that sort. We know of but one or two stories of this character and the prospect is open for hundreds. A short example of this kind of work was "The Problem of Trans-Atlantic Telephony Solved," by Germanicus, which appeared in the Decennial Number of the ELECTRICAL REVIEW. But this was written by a scientific gentlemen who lays no claim to the honors of literature. There are more like him and we prophesy that before very long some of our bright young electricians will realize the possibilities within their grasp, and availing themselves of their technical knowledge, will essay the roll of author.

THE TROLLEY IN THE NATIONAL CAPITAL.

A bill passed the lower house of Congress last week permitting the Metropolitan Railway Company of the District of Columbia to equip its line with overhead wires. This was a great surprise to most people for the reason that Congress ordained a few years ago that no additional overhead wires should be allowed in the Capital, and provided that after July 1, 1892, no cars should be operated there by animal power. In view of the prohibitory act the Metropolitan Railway Company have been indulging in expensive experiments with storage batteries as a motive power. The permissive act just passed is, of course, objectionable in discriminating in favor of the Metropolitan Company as against the Washington and Georgetown Railway Company, which has undergone enormous expense in equipping a five mile double track cable system from the wharves *via* Seventh street to the boundary of the city, and eight miles from the Navy Yard to Georgetown and the city limits, by way of Fourteenth street. Aside from this the act is commendable in showing a disposition to fall into step with progress.

The usual outcry about "dangers to life and limb from the deadly trolley" is pure rot. The overhead system has proven entirely safe in 250 plants in active operation throughout the country. When a single instance of its deadly character is shown it will be time enough to give such fogy croakings serious consideration. The nimble quills exercised in discussing the situation raise the stock objection of marring the beauty of the nation's ward by the unsightly wires—what puerile nonsense! The modern trolley system is a piece of artistic bric-a-brac compared to the thousand and one eyesores which render the streets of any city offensive to the eye of an artist. Why not abolish business signs and street lamp posts, drays and the numerous incidents of industrial life and progress? The people in these times must have every convenience for rapid intercommunication; the trolley system offers the easiest solution now available for rapid transit; the whining of the *dilettante* must be silenced by the voice of the masses. The city which wants to keep up with the procession must have its municipal machinery equipped with the latest improvements.

THE NEW YORK ELECTRIC CLUB.

From the enthusiastic spirit shown by the few members present at the meeting of the Electric Club, held Monday evening, April 11, it would seem that support for the continuance of the Club will be forthcoming. This is as it should be, and the only pity is that the proper spirit was not shown before the affairs of the Club became so tangled. It has been decided to give up the present expensive house and to seek more economical accommodations. What the Club needs now is the support of its members. If there is any reason why this support should not be forthcoming the members themselves must know it, and if they do know it they should communicate it to the board of managers. The members of the Club elect the board of managers as their representatives to operate the organization for their good, and if they have any complaints to make or grievances to air, it is only right and proper that the board of managers should know the facts in the case and act upon them accordingly. It is evident that during the past year the board of managers has acted without any co-operation on the part of the members, and if any mistakes have been made the members are partly to blame. Let the true Club spirit make itself apparent at once.

Mr. Erastus Wiman, vice-president of the Electric Club, is the author of a very interesting article in the *Building and Loan News* of March, on "Practical Utility for the Purchase of Small Homes." The attractive plan of purchasing a home through the Loan Association is presented and particularly refers to the many advantages of Staten Island, which locality meets with great favor in Mr. Wiman's eyes.

CORRESPONDENCE.

OUR CHICAGO LETTER.

E. L. **Babcock,** of the Falls Rivet & Machine Company, Cuyahoga Falls, O., is in the city this week.

The **German Opera House** on Randolph street will be wired throughout with Simplex wire furnished by George Cutter, and installed by the Western Electric Company

One **of the Latest Novelties** to which electricity is applied is an electric dice thrower, made by the Marion Manufacturing Company, this city, and is meeting with a ready sale.

The **Central Electric Company** are well equipped to handle all orders for interior conduit and insulation company's goods, carrying a large stock on hand, which enables them to make prompt shipment of all orders.

W. **C. McKinlock and F. B. Hill,** of the Southern Electric Supply Company, St. Louis, which is a branch of the Central Electric Company, are in the city on business and report the prospect for the Spring trade throughout the South as very flattering.

W. **R. Mason, General Manager,** and W. L. Adams, secretary and treasurer, have this week severed their connection with the Electric Merchandise Company, and will hereafter be connected with a newly organized stock company, with $100,000 capital, to be known as the Railway Equipment Company, with temporary offices at Nos. 617-18-19 Pullman Building.

A Rumor has Been in Circulation this week to the effect that Prof. J. P. Barrett, city electrician and chief of the electrical department of the World's Fair, was about to resign his position to accept a very flattering offer from the National Board of Underwriters' Association, at New York. In an interview with Mr. Barrett he denied the rumor as false in every particular, stating that his interests in Chicago are such that he has no idea of making any change.

The **Detroit Electrical Works,** Detroit, Mich., have this week, through their Chicago representative, Mr. L. E. Myers, closed a contract with the Sioux City and Leeds Railway Company, Sioux City, Ia., to equip between six and seven miles of road with electricity. Their contract calls for the supplying of the road with motors, overhead trolleys, poles, car bodies, and everything except rails. This contract will amount to about $40,000, and we congratulate Mr. Myers on having secured the same.

Professor Cook's Lecture on "Hertz's Experiments" drew a full attendance of the Chicago Electrical Association at their last meeting, April 12. The subject was not new to those present, but the lecturer called special attention to the salient points, and showed how Hertz's researches supported Maxwell's theoretical investigations. They marked a stepping stone in the advancement of electrical science, which leaves no alternative but to treat light and other forms of radiant energy under the head of electrical phenomena. They also threw new light on the penetration of conductors by rapidly alternating currents and, therefore, have their bearing on our practice in constructing lightning rods and in transmitting energy by means of alternating currents. At the next meeting there will be a paper by Mr. F. R. McBerty, on "Sparking and Flashing of Dynamos."

At a meeting of the Common Council, held Monday, April 11, Alderman Webber claimed the right to have brought up, as by agreement for a special order, the ordinance granting a franchise to the Chicago and Evanston Electric Railway Company to construct and operate a street railway on Evanston avenue and Church street. According to the ordinance the company may construct and operate for 20 years a double track street railway, with all necessary switches and connections, commencing at the intersection of Evanston and Graceland avenues, northwesterly along Evanston avenue to Church street. The mayor and commissioner of public works may determine the class of rails to be used. The cars may be propelled from electric overhead wires, suspended from iron or steel poles, provided the mayor and commissioner of public works give permission. In case such permission is granted, the company must bury the wires when ordered to do so by the mayor. The fare to be charged is five cents. The company must pay a license fee of $50 a car, and must furnish the city with an acceptable bond in the sum of $25,000.

Chicago, April 16. M. J. B.

OUR BOSTON LETTER.

The Billings and Spencer Company, of Hartford, Conn., is manufacturing the Billings patent commutator bars for dynamo electric machines.

Mr. Albert Payne, of Concord, N. H., a well-known electrician, and for several years identified with electrical development in New England, was on a visit among his numerous friends in this city during the week.

The W. S. Hill Electric Company, this city, has issued a neat leaflet of four pages, giving illustrations and prices of the company's meritorious electric switches. The neat leaflet is termed "Revised List No. 1."

Dividends.—The New England Telephone and Telegraph Company has declared a dividend of 75 cents a share payable May 14. The Mutual District Messenger Company, of this city, has declared a dividend of $1 per share, payable May 2.

Mr. Levi Cofren, popularly known among the electrical interests of New England during the past seven years as one of the most indefatigable and successful salesmen of insulated wires and cables, has accepted a position with the Washburn and Moen Manufacturing Company, Worcester, Mass.

The Suburban Light and Power Company, this city, whose name became familiar through its late contest with the Boston Electric Light Company, for the contract for lighting the streets of the city of Boston, is about issuing $200,000 of first mortgage bonds, secured by its plant in this city.

The National Machine Company, Hartford, Conn., has removed to the new building erected by the Hartford Board of Trade, and has its entire floor space fitted up with new and latest improved machinery. It will manufacture the Daimler electric motor, which is said to possess new features of considerable merit.

The Beacon Vacuum Pump and Electrical Company, this city, has issued a neat, yet novel, advertising scheme to keep its meritorious product continually in the minds of users of incandescent lamps. The scheme is simply a blotting pad in the shape of an incandescent lamp bulb with particulars concerning the Beacon lamp printed neatly on the blotter. W. I. B.

Boston, April 16.

OUR SAN FRANCISCO LETTER.

Cars are running on a portion of the San Francisco and San Mateo electric road.

During the recent wind storm a schooner dragged its anchor and fouled a telephone cable in the bay.

The Sunset Telephone Company will spend $500,000 this year in improving its service throughout this State.

The Edison General Electric Company are to install an isolated incandescent plant in the Mills' building on Montgomery street.

The North Beach and Mission Street Railroad Company have laid temporary rails on East street to the ferries. In order to hold their franchise it is their intention to run horse cars over this line.

A Number of local capitalists in San Jose, Cal., have purchased the franchise of the Alum Rock and San Jose steam motor line, it being their intention, at an early date, to construct an electric road between the two places.

At Last the Oakland, Haywards and San Leandro electric road has been granted right of way into the heart of Oakland by the city council. Rails have been laid as far as San Leandro, and the power house is fast nearing completion.

Attorney General Hart, in the name of the people of the State of California, has filed a complaint enjoining the North Beach and Mission Street Railroad Company from erecting poles for its electric road, and demanding the removal of some 170 which have already been erected within the restricted territory.

Two Striking Examples in California of the municipal ownership of electric lighting plants and its consequences can be cited in the cases of the cities of Alameda and Berkeley. These two cities, a number of years back, purchased lighting plants, but in a short time found themselves burdened with "white elephants," as they have termed them. Their lights were costing them more to maintain than would be paid for contract lighting, and not only that but they were receiving poorer service. The board of trustees of Alameda thought they saw a way out of the difficulty by placing more money in the concern. They did this but are now worse off than ever, and are on the verge of giving the plant away to some one and allowing him to furnish light at a monthly rental. Berkeley turned its plant over to A. A. Osborne, who was to take full charge of the plant, furnishing the city light at a low monthly consideration, but was given the exclusive privilege of furnishing incandescent lighting for commercial and private uses. Mr. Osborne found himself handicapped, and after going into bankruptcy was obliged to turn the plant over to Price Brothers, of Oakland. The sequel of this "Tale of Two Cities" is awaited with no little interest. J. R. K.

San Francisco, April 16.

The Tropical American Telephone Company, Limited, has removed to the Western Electric Company's building in Greenwich street, New York. Chas. M. Hough is the new president, H. B. Thayer general manager, and Mills H. Landon treasurer.

Death of Mr. A. B. Uline, the Prominent Telephone Man.

We chronicled last week the sad fact of the death of Andrew B. Uline, of Albany, N. Y., the widely-known telephone man, which occurred at Nassau, N. P., April 4. On Friday of last week, Mr. W. D. Sargent, vice-president of the New York and New Jersey Telephone Company, who was with Mr. Uline, arrived in New York, returning on the first boat that left Nassau after the sad occurrence. He was accompanied by Mr. E. J. Hall and wife, of Buffalo, and son-in-law, who were also members of the party.

Mr. Sargent stated that Mr. Uline had complained during the day, April 4, of not feeling well, and had laid down in the afternoon, but in the evening ate his supper as usual and returned to his room about eight o'clock, after consulting a physician. At 10 o'clock, while engaged in packing in an adjoining room, as the entire party expected to leave Nassau the following morning, Mr. Sargent heard Mr. Uline groaning, and rushed into his room to find him evidently in great pain and unconscious. A physician came promptly, and every means possible was applied to restore him. A few moments before he died, Mr. Uline spoke, saying, "I am so sick." The physician asked him to take some medicine he had in his hand, and, in tones of evident agony, he said, "I will

ANDREW BENJAMIN ULINE.

take anything." These were his last words, for in a few minutes he died.

Arrangements were at once made by Mr. Sargent to bring the body back to Albany, but this idea had to be abandoned, as there was no means of embalming at Nassau, and it was found impossible to preserve the remains, although three different metallic coffins were made. The body was interred with Masonic rites in the cemetery at Nassau, and the grave covered with flowers and evergreens secured by Mr. Sargent, who also, with great thoughtfulness, had several photographs taken of the scene to bring home with him to the afflicted family. It is thought possible that in the course of a few months the remains may be brought home.

The brother and other relatives of Mr. Uline met Mr. Sargent upon his arrival in New York city, Friday afternoon of last week, and expressed their deepest sense of thankfulness to him for the extremely kind and considerate manner in which he had acted throughout the sad affair. Although Mr. Sargent himself was far from well at the time, and is naturally greatly saddened by this unlooked for and most regretful ending of a pleasure and health-seeking trip, his many personal friends will be glad to know that his health is somewhat improved, and that he has been able to perform the difficult and arduous work demanded by the occasion without apparent physical loss. Mr. Sargent speaks in high terms of kindness shown him by the hotel people, the physician and the Masonic fraternity of Nassau.

It seems that Mr. Uline had a premonition of death, and, before leaving for the Bahamas, had made his will and arranged his affairs in order.

We present above an engraving of Mr. Uline, which is a very faithful and accurate likeness of this notable telephone man.

World's Fair Incandescent Lighting.

On Thursday of last week the Exposition officials at Chicago agreed to award the contract for furnishing 93,044 incandescent electric lights to the Edison General Electric Company, at an average price of $5.95 per light. This includes the entire incandescent plant and its maintenance.

The matter had been engineered by Directors Schwab and Clowry, of the Committee on Grounds and Buildings, and Electrical Engineer Sargent. At the meeting Thursday, Lieutenant Spencer appeared for the Thomson-Houston Company, Charles C. Lockstaedt for the South Side Metal and Machine Works, and John I. Beggs for the Edison Company. The electricians were called before the committee singly and allowed to make their bids. The bids received several weeks ago were formally rejected, and then the contest opened free for all, and resulted as above stated.

PERSONAL.

Prof. George Forbes, of London, is visiting New York.

City Electrician John P. Barrett, of Chicago, was in New York last week and paid a visit to the Manhattan Athletic Club.

Mr. H. G. Martin, of the New York office of the Thomson-Houston Electric Company, has returned to his duties after a six weeks' illness.

Mr. Harvey Prentice Dwight has succeeded Mr. Erastus Wiman as president of the Great Northwestern Telegraph Company, of Canada.

Mr. Charles Ffrench, for a number of years the London representative of the ELECTRICAL REVIEW, is visiting New York and will travel through the United States, with a view of permanently locating himself in this country.

Mr. W. H. M'Kinlock, of the Central Electric Company, Chicago, and Mr. Geo. T. Manson, of the Okonite Company, New York, are taking in the Pacific coast and will be absent from their accustomed places about six weeks.

Mr. R. J. Getz, president of the Aluminum Carbon Company, Buffalo, N. Y., visited New York last week. Mr. Getz's company has recently increased its capital stock to $75,000 and is enjoying a good share of business.

Mr. J. R. McKee, general manager of the Thomson-Van Depoele Electric Mining Company, Boston, passed through the city last week on his way to Washington. He was accompanied by Mrs. McKee, who was called to Washington by the illness of her mother, Mrs. President Harrison.

Niagara Falls.

These grand and picturesque falls can now be seen in New York city with all the vividness of nature, lacking only the roar of the falling torrent. The panorama of Niagara Falls, just thrown open to the public on Fourth avenue and Nineteenth street, is a wonderfully realistic picture of our greatest work of nature. The artist has depicted the scene from a point of view on the Canadian side that includes both the Horse Shoe and the American Falls, and also gives beautiful glimpses of the landscape clad in the rich verdure of Autumn. The sight is most attractive and the panorama will be visited by thousands who have never seen the falls, and many of them will immediately resolve to visit Niagara and see the real. The painting cannot fail to awaken renewed interest in the Falls of Niagara, the most wonderful and fascinating work of nature on the globe. Now that so many plans of utilizing the falls for supplying power are being discussed by electricians, the panorama in this city will prove of especial interest in electric power circles.

The first view of the new painting was given Saturday afternoon April 16. A number of the friends of Mr. George H. Daniels, general passenger agent of the New York Central Railroad, were present on that occasion in response to his courteous invitation. As the falls form an additional attraction to the Hudson river scenery of his line, Mr. Daniels very naturally takes an interest in the work of the artist in presenting the panorama to the public.

Telephonic News

*** Menominee, Mich., is placing her telephone wires underground.

*** Preparations are being made for a telephone between Savannah, Spring Lake and Port Byron, N. Y.

*** The Cincinnati telephone exchange is rapidly getting its wires underground. General Manager Stone intends to push the work to completion as fast as possible.

*** The Central Union Telephone Company is making some extensive improvements in its plant at South Bend, Ind., made necessary by the rapid growth of the exchange.

*** Edwin B. Cottrill, until recently auditor of the Wisconsin Telephone Company, has been made superintendent in place of F. E. Parker, resigned. D. E. Roberts has succeeded Mr. Cottrill as auditor and purchasing agent.

*** The Sunset Telephone Company at Seattle, Wash., has received orders from General Superintendent Lawrence, at San Francisco, to ship $25,000 worth of Washington cedar poles for the telephone service in California. It is expected that three other orders will be received making a consignment of similar value in a few days. The poles are obtained chiefly in the Snoqualmie district.

*** It is stated that it is quite probable that the Texas syndicate will not be able to exercise the option given by the Erie Telegraph and Telephone Company to purchase for $700,000 the southwestern territory. The time expires in about six months. The syndicate, however, has placed about 200 shares of stock among influential parties in different sections of Arkansas and Texas. Erie Telephone Company's sub-companies made a net gain of 127 new subscribers in March, and for the three months ending March 31, 236. Increase for the fiscal year, 871. Total connected March 31, 14,247.

*** General Superintendent Baker, of the Southern New England Telephone Company, has just given orders for the further convenience of subscribers. Hereafter Danielsonville, Greenwich, Manchester, Ridgefield, Rockville, Southington, Torrington, Windsor Locks, Branford, Litchfield, Thomaston, Woodbury and Newtown, Conn., offices will be open from 7 A. M. to 9 P. M. on week days, and from 9 to 10 A. M. and 5 to 6 P. M. on Sundays, giving three hours' additional service. Bristol, Essex, Falls Village, New Milford, Putnam, Willimantic and Winsted will hereafter be open during the noon hour, and Bristol and New Milford will be open all night.

*** Among the important new buildings now going up in Nashville, Tenn., is the new house into which the Nashville Telephone Exchange expects to move about the first of next October. It is being built on the east side of College street, a little south of Church street, almost opposite the College street wing of Baxter Court. The foundations have been completed and the brick work is under way. The building will include three stories and a basement. The front of which will be entirely of hydraulic pressed brick and terra cotta work and will be quite ornamental, finished with terra cotta trimmings. The front part of the basement and entire second floor will be rented for offices. The offices of the telephone company will be on the first floor and the company will use the rear of the basement as a repair shop. The telephone operating room will be in the third story. The company is showing a progressive spirit, the condensing of a multitude of wires into cables on a portion of its lines being one of the marked improvements that is being effected.

An Electrical Surgical Instrument.

An ingenious electrical surgical instrument has been designed by Stephen R. Bradley, of Nyack, N. Y., whereby physicians or surgeons can ascertain the interior condition of various organs of the body and can detect the presence therein of harmful matter—as, for instance, stone in the bladder. The instrument is designed to be used in any of the organs of the human anatomy accessible by instruments, but into which the hand of the surgeon cannot pass nor optical observation be obtained.

The purpose is to supply a device which shall be in effect an electrically operating extension of the finger of the operator, which shall convey from the end of the instrument to his actual finger, upon which it is attached substantially, or at least measurably, the same sensations that he would experience if his actual finger were present where the device is and in contact with the same surfaces.

The apparatus consists, generally stated, in a series of insulated electrical wires which pass through a rubber or a similar tube having at one end a finger-sheath adapted to be placed upon one of the fingers of the hands of the surgeon, so that electric sensation will be conveyed to his hand, and at the other end there is an elastic bulb-like device composed of an inner and an outer part, and near the surface of the inner part the ends of the wires are arranged so that when the outer part, the inside lining whereof is a conductor of electricity, is compressed upon it an electric circuit will be closed and the physician will receive in his finger slight electrical sensations resembling those which would be experienced by his naked finger if in contact with the same surface, which will indicate to him the presence of unhealthful or disordered conditions in the interior of the organ. One of the wires connects with the lining of the said outside bulb and carries the current continuously to it. The other wires are insulated from each other and are wrapped about between the finger-sheath and the enlarged terminal by any suitable substance, preferably insulating material, so that they in the aggregate constitute a flexible device somewhat like a catheter, which will have the requisite rigidity to serve the purpose and yet be sufficiently flexible. There is also a tube connected to the instrument, through which solvents or medicinal preparations may be injected upon the unhealthful spot.

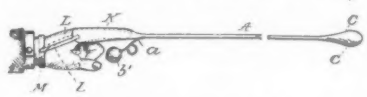


FIG. 1.—AN ELECTRICAL SURGICAL INSTRUMENT.

In the engravings, Fig. 1 shows a general view of the instrument which is provided with a finger-sheath and means for fastening it to the hand. A small syringe is attached as shown at b^1 for injecting drugs. The structure of the instrument is shown in Fig. 2. A number of wires are employed, one of which is in electrical contact with a metal foil lining G on the inside of the soft rubber tip of the instrument. The other wires are out of contact with the foil, except when the lined rubber is pressed against them by some obstructive matter. These wires are similarly arranged at the ends, so that sensation will be conveyed to the finger at a point corresponding to the point at which the obstruction depresses the rubber tip.

The surgeon or physician, after adjusting the finger-sheath on one of the fingers of his left or right hand, as preferred, introduces the other end of the instrument in the manner that catheters and like instruments are now introduced. The bulb being introduced is moved about within the disordered organ with as near as may be the same movements and into the same parts or places that the physician would move his actual finger to detect or ascertain its interior condition, and the pressure of the walls of the organ against the outer bulb compresses it with greater or less pressure upon the inner one, and the outer surface being decidedly elastic yields slightly, so that the ends of the wires are brought in contact with the metallic lining of the outer bulb. Thus the electric circuit is closed, and the surgeon feels in the end of his finger an electric sensation at exactly the same spot upon the end of his finger that he would if his finger were actually where the bulb is, because, as before stated, the wires are arranged upon the bulb in exactly the same relative position that they are in the finger-sheath. If the bulb come in contact with any abnormal enlargement or disordered condition—as, for instance, a stone in the bladder, tumor, or the like—then the bulb may be carried all about such thing, whatever it may be, and, by increasing the pressure of the bulb against it, the wires which are farthest from the surface of the inner bulb will be likewise brought in contact with the metallic lining of the outer one. Thus the electrical sensation will be increased in exactly the same way that the physician would receive increased sensation if the actual finger pressed harder upon such body.

The information which the surgeon receives by the use of this instrument is frequently of vital importance. Great suffering can often be avoided if this knowledge is had, and sometimes the necessity for serious, if not fatal, operations may be postponed for relatively long periods or perhaps entirely avoided; also, sometimes this knowledge will show the surgeon that an operation is immediately necessary.

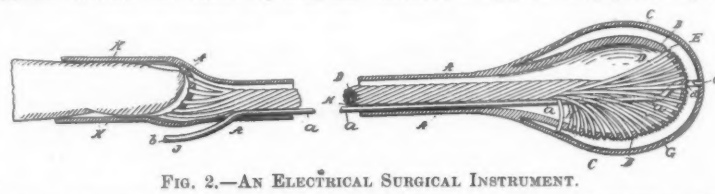


FIG. 2.—AN ELECTRICAL SURGICAL INSTRUMENT.

The Okonite Cable Arrives at Oakland, Cal.

The immense reel of Okonite submarine telephone cable mounted on a flat car, which was illustrated and described in the ELECTRICAL REVIEW for March 26, 1892, has arrived at the mole at Oakland, Cal. It was ordered by the Sunset Telephone & Telegraph Company, and will be used in making telephone connection between Oakland and San Francisco.

This section, weighing 70,000 pounds, will be laid from the wharf to Goat Island; across the island the current will be carried by 30 heavy copper land wires, and from the other side a similar cable will carry the messages to Oakland. Hitherto communication with interior points has been over a 10-wire cable and ordinary iron lines.

The company has already established, between San Francisco, Stockton and Sacramento, an improved metallic circuit service. Copper wires are being stretched to all interior points, and in a few months one end of the State will be in communication with the other. The Sunset Company has contracted for 10,000 poles and 4,000 miles of copper wire, and the lines are being strung along as rapidly as possible. Five hundred thousand dollars will be spent in this work this year.

Bernstein Electric Manufacturing Company's New Type of Motor.

The accompanying cut illustrates the lines and general arrangement of fields and armature used by the Bernstein Electric Company in the construction of their fan and light power motors which they are at present putting on the market. There is, of course, nothing new or radical in the form they have adopted, but it is one that allows a high efficiency and output per unit of weight and what possibly is of equal importance in constructing the smallest types of fan motors which are only intended for fan work in offices, houses, restaurants, stores, etc., it is a form which permits of graceful and tasty outlines and a thoroughly mechanical appearance.

THE BERNSTEIN ELECTRIC FAN MOTOR.

The smallest type of motor made by the Bernstein Electric Company is intended for fan work solely. This motor is extremely compact and with a total weight of only ten pounds and a total height of eight inches carries an eight inch fan at either 2,000 or 1,700 revolutions.

The larger sizes which the company is manufacturing are intended for either power work at constant speed or for the driving of ventilating fans, which are either belted or attached directly to the shaft. These machines are shunt wound, have self-oiling bearings and embody such other advantages as are found in standard motors.

The uses to which such small motors may be put are many as, irrespective of the growing demand for electric motors for ventilating purposes, there are many light machines, such as coffee grinders, ice cream freezers, dentist's drills and others of similar nature which can well be driven by electric power while in nearly every machine shop in the country electric motors can be economically employed for driving isolated and light intermittently running machines.

Dividends.

The Edison Electric Illuminating Company, of New York, has declared a quarterly dividend of 1¼ per cent., payable May 2.

The Edison Electric Illuminating Company, of Boston, has declared a two per cent. quarterly dividend, payable May 2 to stockholders of record April 14.

The Thomson-Houston Electric Company has declared a quarterly dividend of $1 per share, payable May 14. Books close May 5 to 14, inclusive.

Electric Wiremen Strike.

The members of the Electric Wiremen's Union carried out last week their threat of striking for $3 a day. About 300 men went out, and by Monday evening Walking Delegate Ivory reported that 200 had gained their demand. The remaining 100 are employed by the smaller firms, with the exception of those employed by the Eureka Electric Lighting Company. This company is doing work for a large building at 44 Pine street, and the Board of Walking Delegates proposes to order a strike there.

Electricity and the Looms of St. Etienne, France.

REPORT BY UNITED STATES COMMERCIAL AGENT LOOMIS.

The city council of St. Etienne has decided upon a departure which will have an important effect on the silk and ribbon industries, both in Europe and in America.

It was resolved recently to apply electric motive power to all the hand looms in this city, and contracts have been made with an electric company for the necessary plant and currents.

The electric dynamos are to be driven by water from the city reservoirs. There is practically an unlimited supply of water in the reservoirs with a fall of upwards of 100 feet. The cost of producing the electricity will be reduced to the lowest point possible.

To grasp the importance and far reaching results of this innovation it is necessary to understand that the bulk of the enormous output of ribbons ($21,000,000 a year) is the product of house industry. The weavers, for the most part, own their own looms and operate them by hand in their own houses. There are 18,000 looms which are thus distributed among the homes of the weavers, while the number of looms driven by steam in the few ribbon factories of the town is only 5,000. The 18,000 looms of the independent weavers are valued in the aggregate at $4,500,000.

What the city of St. Etienne proposes to do is to convert each one of the 18,000 hand looms into a power loom driven by electricity. Electric light will also be furnished.

The result of this change from slow, laborious, uncertain hand power to the swift, regular, unfailing power furnished by electric motors will be an increase in the productive capacities of the looms and a considerable reduction in the general expenses of fabrication. In other words, art will be wedded to modern machinery.

The weavers of St. Etienne have always been the most artistic ribbon makers in the world, but they have enjoyed few mechanical advantages. Now, the old order of things is to be changed, and the products of the St. Etienne ribbon looms, which have been a trifle more costly than similar products in some other countries, notably in Switzerland, will be turned out at the lowest possible prices. The weavers employed in the ribbon trade number 70,000 souls.

I annex the outline of the formal plan adopted by the city of St. Etienne for the purpose of applying electric power to the ribbon looms.

Article 1. The city of St. Etienne decides to make the experiment of supplying electric motive power to the various houses containing looms. This experiment will continue two years and shall be made under the following conditions:

Art. 2. The electric plant shall comprise a central distributing station equipped to furnish a current with an initial force of 50,000 volts. This station will be supplied with a steam motor and generator and all the accessories. From this station wires must be laid to conduct the current a distance of 17 kilometres. Twenty-five distributing centers are to be established and a certain number of lamps to be furnished.

Art. 3. During the two years of trial the contractor will provide, at his own expense, for the regular working of the plant, and will bind himself to supply the current from 6.30 o'clock in the morning to 7.30 o'clock in the evening, except on Sundays and fête days.

Art. 4. The renewal of the lamps and the transformation of the looms in order to meet the requirements of the application of the electromotive power are not at the cost of the contractor.

Art. 5. The power house and a small office for the clerks will be furnished by the city, as well as the water supply.

Art. 6. The contractor will bear all the expenses concerning the putting up and keeping in order of the plant and apparatus.

Art. 7. The city will collect at its expense, risk and peril all the taxes relative to this undertaking. It will select the positions throughout the town where electro-motors should be placed and will, in general, be responsible for the administrative part of the business.

Art. 8. The contractor will be responsible for all accidents arising from his negligence or that of his employés.

Art. 9. The contractor will be allowed six months from the date of signing the agreement to put the whole system and plant in working order.

Art. 10. In order to cover a part of the expenses of the contractor, the town will pay him in quarterly installments an annual sum of 10,000 francs, together with two-thirds of the total amount of the taxes collected for this purpose.

Art. 11. The town reserves to itself the right to annul the contract at any period during the two years' trial, on the condition, however, that the contractor receives from the day of the putting in motion of the whole machinery a sum not inferior to 15,000 francs.

Art. 12. At the expiration of the two years' experiment the city binds itself, if the trial has been satisfactory, to buy up all the material according to the specified price accepted by both parties.

Art. 13. The expense of converting the hand looms into power looms will be borne in the first instance by the city. The recipients of this benefit are expected to reimburse the city by means of small monthly payments.

For the use of the current and motor a charge of seven cents a day per loom will be made.

The weavers have received the announcement of the adoption of the foregoing plan by the town council with signs of robust satisfaction. The experiment is a large one and seems to the people here to be as benevolent as it is novel.

That Telephone to Mars.

When Edison begins to build
His telephone to Mars,
Will he have to dig the post-holes
On the intervening stars?

Or will he fire his wire
Up into the air—far up—
From one of those big guns
That are made by Mr. Krupp?

When they are thus united
They will make a handsome pair,
For Mars is a brave soldier
And the Earth is very fair.

When they take their wedding journey
With the wire stretched pretty tight,
Will the honeymoon be over
If it strikes our satellite?

Still, I'm very much afraid
That Mars will not agree
To dangle at Earth's apron-strings,
However fair she be.

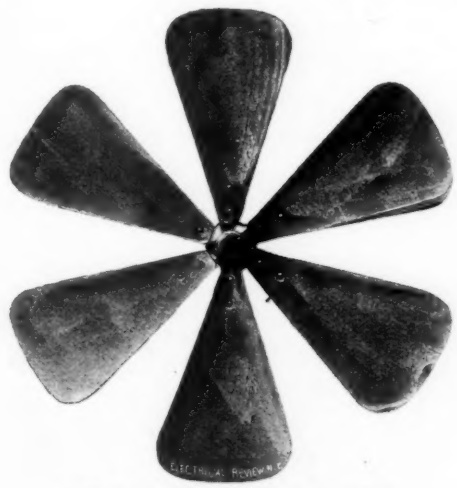
Oh! no! Our learned inventor
Has a better plan than these,
For he's long been acquainted
With the heavenly mysteries.

When a passing thunder-cloud
With his message is impressed
Thomas A. will "press the button;"
His friend Jove will "do the rest."

—*Kansas City Star.*

A License Granted.

Herbert C. Wirt and James S. Kimball, of Boston, inventors of the famous "K. W." devices, have granted an exclusive license to the Bryant Electric Company, of Bridgeport, Conn., for the manufacture of the "K. W." ceiling rosettes and fuse blocks.



A NEW AND NOISELESS ELECTRIC FAN.

A New and Noiseless Electric Fan.

Holmes, Booth & Haydens, of New York city and Waterbury, Conn., are the manufacturers of a new brass fan for electric motors, which we illustrate in this issue of the REVIEW. In these fans, so as to secure safety from their coming loose and flying off and doing damage, the best of metal is used, the riveting is double and the blade is close fitting.

One particular claim made for the new fan is that there is no humming. The balance of the blade is perfect and this is secured without disfiguring the blade with a blotch of solder, as is often the case.

The fan is so formed that the breeze is evenly distributed. The company also furnish wire guards for any size fan, and manufacture them with from 6 to 15 blades, polished and lacquered, and also silver-plated when desired.

Injunction Dissolved.

Judge Truax, in the Supreme Court, on April 14, dissolved the injunction obtained by default by the W. J. Johnston Company against W. T. Hunt and the *Electrical Age* Publishing Company. This was an action brought by the W. J. Johnston Company to restrain W. T. Hunt from soliciting advertising for the *Electrical Age* and the *Electrical Age* Publishing Company from employing Hunt.

A Fire-Proof Building.

The Berlin Iron Bridge Company, of East Berlin, Conn., have taken the contract to build a producer building for the Solvay Process Company, of Syracuse, N. Y. The building will be 30 feet wide by 100 feet long and three stories high, built entirely of iron, even the floors being made of plate iron, in order that there may be no wood-work about the building to take fire.

The Telephone in England.

The Duke of Marlborough, in an article in the *New Review* on "The Telephone and the Post Office," sets forth what ought to be done in England to make the telephone as useful in that country as it is in other countries. He gives the following as the latest available statistics on the subject:

	No. of Exchange Subscribers.	No. of Conversations during 1891.
United States	490,000	450,000,000
Germany	59,086	223,000,000
Sweden	19,367	21,000,000
Switzerland	10,945	5,500,000
Belgium	6,045	12,000,000
Italy	10,481	16,759,000
Great Britain and Ireland (estimated)	40,000	75,000,000

It is held that the reason why England is so far behind is because the post office has stood in the way of all improvement.

The following is given as the proper solution of the telephone question in England: "The government should at once undertake to lay all the necessary main lines through England, establishing either one or more central inter-town exchanges, say, at Manchester and Glasgow, and converging these lines upon London. The distribution in towns could then be done more effectively by the present existing licensees, if those licensees established a town wire system. Any subscriber of the London system could, therefore, speak through the government lines to any subscriber on the Manchester or Glasgow system in his own private residence, which is the whole point of the telephone.

"I am prepared to produce the plan by which I will show that it is perfectly practicable to work a system of over 50,000 subscribers in London alone, and I am prepared to state, as an absolute fact, that, with proper facilities of the most ordinary and simple character for the purpose of laying a few tubes underneath the pavement, I will, in the course of three years, have over 25,000 subscribers speaking in London alone on a twin-wire metallic circuit."

TELEGRAPHIC

.... When the Aspinall telephone commission bill for New York city and Brooklyn came up last week, Senator Aspinall had it laid aside for amendment, as the Assembly has already killed a similar bill.

.... The newly elected officers of the Lexington, West Kill & Shandaken, N. Y., Telegraph Company are: B. O'Hara, president; H. B. Briggs, vice-president; E. O'Hara, secretary and treasurer. An annual dividend of six per cent. has been declared.

.... At a meeting last week of the Canadian House of Commons Committee on Banking and Commerce, the act respecting the Bell Telephone Company, empowering them to increase their capital stock from $500,000 originally to $5,000,000, was approved and reported.

.... The fact that the Western Union Telegraph Company is anxious to build a handsome office building in Chicago leads to the inference that other property will be obtained if the lease on the company's quarters, at the southwest corner of La Salle and Washington streets, expiring in 1897, can not be renewed on terms satisfactory to the company. It is likely a new straight 99 years' lease will be arranged between lessors and lessee within a reasonably short time.

.... The Farmers' Loan and Trust Company, of New York, began a suit in the Supreme Court over a year ago to foreclose a mortgage of $1,200,000 upon the property of the United Lines Telegraph Company, which the Postal Telegraph Cable Company leased in 1889. When the foreclosure suit began an accounting was demanded from the Postal Company, and Henry Winthrop Gray was appointed receiver of the United Lines. Last week argument was heard by Justice Lawrence upon a motion made on behalf of Receiver Gray for an order to compel the Postal Company to turn over to him rentals claimed.

NEW INCORPORATIONS.

Camden, N. J.—The Egg Harbor City Water, Electric Light and Power Company, of New Jersey; capital, $30,000. Promoters, W. W. Taylor, J. M. Mays and W. R. Cason, of Philadelphia.

Bozeman, Mont.—Gallatin Light, Power and Railway Company; capital, $150,000. Promoters, W. G. De Celle, S. M. Houghton, Helena, Mont.; W. H. Clark, St. Paul, Minn., and C. J. Clark, Minneapolis, Minn.

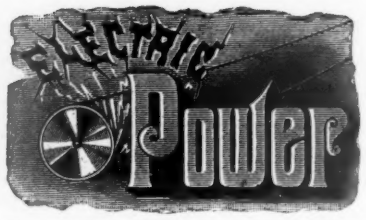
Denver, Colo.—The Denver Electric Company; capital, $500,000. Promoters, Job A. Cooper, Charles L. McIntosh, George W. Trinible, Absolam V. Hunter, Charles Boettcher, all of Denver, Colo.

Davenport, Ia.—National Investment and Improvement Company; capital, $2,000,000. Promoters, Chas. F. Hathaway, Henry G. Davis and Azell C. Buell, of Davenport. Incorporation papers sent to Ferd. Ascherman, Davenport, Ia.

New London, Conn.—The Connecticut Tramway Company; capital, $20,000. Promoters, Dwight Townsend, of New York city, and Tracy Waller, of New London. Incorporation papers sent to Tracy Waller, New London, Conn.

Winona, Minn.—Winona Electric Light Company; capital, $50,000. Promoters, T. T. Hayden, J. H. Jenkins and R. T. Doud, of Winona, and C. L. Bonner, of Minneapolis. Incorporation papers sent to J. A. Tawney, Winona, Minn.

Metropolis City, Ill.—The Metropolis Water Company, to furnish water, electric light, heat and power; capital, $5,000. Promoters, Geo. C. Morgan, Arthur M. Morgan and Henry A. Gardner. Incorporation papers sent to H. A. Gardner, First National Bank building, Chicago, Ill.



* * Proposals are being made to convert the existing horse railways in Vienna, Austria, and Budapest, Hungary, into electric lines.

* * A rousing meeting was held at Kennebunk, Me., last week to talk over the proposed electric railroad between Kennebunk and Sanford.

* * The Edison plant at Schenectady, N. Y., is to be increased by the addition of a new brick building 550 feet long, to be used as a porcelain works.

* * The Royal Electric Company, of Montreal, Canada, has obtained a charter for using the Chambly Rapids for developing electric power. About 20,000 horse-power is available.

* * The Vermont Electric Company, of Burlington, Vt., is making arrangements to utilize the large water power at the gorge above Winooski, and a side-track is to be laid from the Central road to carry the necessary material there.

* * Ohio is just now going wild over electric railroads between towns. For example, roads are projected from Massillon to Canton, Painesville to Fairport, Warren to Niles, Niles to Mineral Ridge, Cuyahoga Falls to Akron, Cleveland to Chagrin Falls, and Cleveland to Berea.

* * The electric welding of street railway rails as a substitute for fish plates has been the subject of experiment for some time at the works of the Johnson Rail Company, Johnstown, Pa. The experiments are now said to be entirely successful, and it is possible to weld by electricity two pieces of steel of 25 square inches section, and a solid steel rail, three or four miles long, can be had if required. The tests also are said to prove that the necessity of joints to provide for contraction and expansion is not so apparent as supposed by engineers. The process has also been successfully applied to welding of wire cables.

* * A suit brought by Reinhart N. Thier against the Brooklyn City Railroad Company for $10,000 damages for personal injuries is on trial in the City Court before Judge Clement. On June 29, 1891, the plaintiff was a passenger on the Second avenue line, operated by the trolley system. Counsel in opening the case said that the road was uneven, and that on the jolting of the car plaintiff's hat fell off in the street. He asked the conductor to stop the car, and stood on the step while it was being slowed up. The front car stopped suddenly, causing the second to bump against it, and throwing the plaintiff in the street. The man struck on his head, receiving injuries to his brain.

Commutation Rates on the West Shore to be reduced May 1.

A most important step in the direction of increasing the suburban traffic on the West Shore will be taken May 1, when the company has decided to place in effect a new commutation tariff which materially reduces the commutation rates now in effect. Not only is there to be a reduction in the rates, but the company has decided to return to the old method of the flat rate per month, or, rather, the same rate for each month's ticket. The old system has not been popular with commuters, and the new arrangement will, no doubt, meet with universal commendation. The new tariffs will be out in a few days and may be obtained from any of the offices of the West Shore. Provision will be made so that no injustice will be done to commuters who are now purchasing under the sliding scale, and, if desired, they will have the privilege of continuing to purchase under the old scale until the full 12 months are completed, in order to get the benefit of the sliding rate.

Philadelphia's Electrical Statistics.

A recent report shows that there are 1,871 arc lights, including 50 owned by the Girard Trust. There are 12,982 poles in the city, of which 7,452 belong to private corporations, and 5,530 belong to the city. There are 3,556 miles of telegraph and telephone wires and 652 miles of electric light wires in the city. In addition to that the city has 837 miles of overhead wires, making a total of 5,046 miles of overhead wires in the city.

There are 1,474 miles of underground wires, of which the city owns 136 miles. There are also 14,394 attachments by private corporations to city poles, for which the city receives 50 cents each per year, or a total of $7,197.

The progress made in laying underground wires is most satisfactory, and, considering the comparatively small outlay, shows excellent results. During 1891 there were laid by the city 3,991 feet of six-inch conduits and 4,633 feet of four-inch conduits.

The various companies by their returns show that, together with that laid by the city, there are 645,464 feet of underground conduit (an increase over last year of 25,601 feet), of which the city owns 59,030 feet (an increase over 1890 of 11,073 feet).

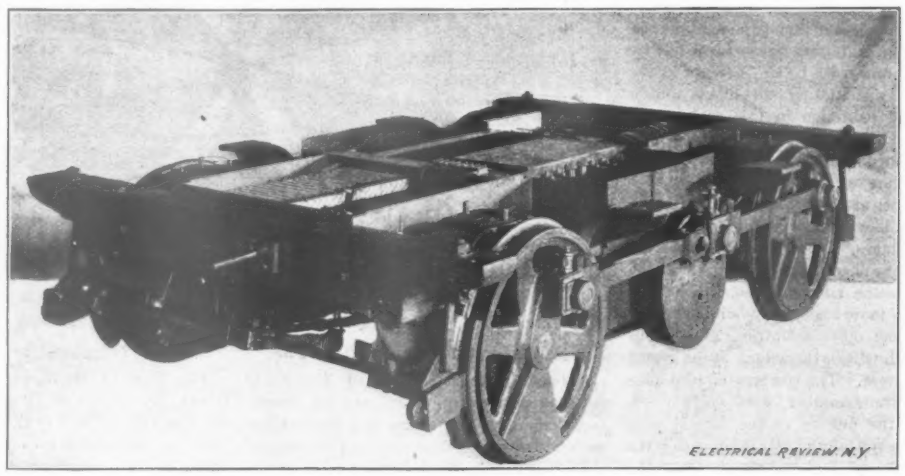
The number of feet of duct laid underground by the following companies are: American Telegraph and Telephone Company, 1,925,812; Bell Telephone Company, 1,127,047; Frandford Avenue Merchants' Electric Light Company, 68,850; Merchants' Electric Light Company, 38,160. Making a total of 3,159,869.

The number of miles of wire in use by telegraph, telephone and electric light companies, together with the city wires, overhead is 5,046.48, a decrease of 511.03 miles.

The number of attachments to city poles are 14,394, an increase of 498. The number of miles of wire placed underground during the year 1891 was 1,474.39. The number of poles used by telegraph, telephone and electric light companies (exclusive of those along railroads) on the highways of the city is 7,452, an increase of 825. The number of city poles is 5,530, an increase of 221, making a total of 12,982, or an increase of 1,050 over that of 1890. The number of messages transmitted over police wires was 324,202, an increase of 21,582 over 1890. Number of telephone messages 14,613.

Western Electric Company's Railway Equipment.

The Western Electric Company, Chicago, are building motors and trucks for street railway equipments under the Eickemeyer-Field patents. Our illustration shows one of their recent productions in this line. The Western Electric Company built recently, for the Toledo, O., Consolidated Street Railway Company, 12 car equipments each provided with one 30 horse-power gearless motor of the type named. They are giving perfect satisfaction, and an order for as many more is now in hand. This department of the Western Electric Company's business is rapidly growing, and they will make a strong bid in the future for their share of electric railway work.



EICKEMEYER FIELD MOTOR AND TRUCK, MANUFACTURED BY THE WESTERN ELECTRIC COMPANY, CHICAGO.

LITERARY.

"Journal of the United States Artillery," for April, 1892, has come to hand.

We have received the April, 1892, issue of the "Bulletin of the Boston Public Library."

"Reports from the Consuls of the United States," for December, January and February, have been received.

The Bureau of Education has sent us "The Fourth International Prison Congress at St. Petersburg, Russia," by C. D. Randall, official delegate from the United States.

The Journal of the British Institution of Electrical Engineers for March, an index to Volume XX of the Journal and a list of officers and members of the Institute, corrected to January 31, 1892, have been received.

"Transactions of the American Institute of Electrical Engineers," for February, 1892, contain "A Proposed System of Alternating-Direct Current Transformation," by Lieut. F. Jarvis Patten, and "Note on the Molecular Movement in a Conductor," by Prof. A. E. Dolbear. The latter paper has been published in the ELECTRICAL REVIEW.

The Note and Comments of the May number of the *North American Review* will include a brief article on our exports to Mexico, by the Mexico Minister; Can We Have Cheap Cabs? by A. J. Cassatt, of the Pennsylvania Railroad; Twenty-five Years of Alaska, by Ivan Petroff; Contracts and Currency, by Sylvester Baxter, and The Growth of Cities, by Chas. M. Harvey.

We are in receipt of a copy of the *New England Courier*. It is a German-American weekly paper published in Boston, Mass., and supplies a need which has long been felt by the large and growing German-American population of that city. Like all papers which have a right to hope for success, it pays special attention to electrical matters, almost every issue having an article of an electrical nature.

"The First News Message by Telegraph" is the subject of the "Historic Moment" article in the May *Scribner*, and the event is described by John W. Kirk, the only man present in the room in the Capitol at Washington when Professor Morse received this message, on May 1, 1844. From that day, in less than half a century, the telegraph as a bearer of news has grown with astounding rapidity, until now it is not unusual for the Associated Press of New York, New England, the South and the West, to send and receive in a single day more than 100,000 words of news messages.

The May number of Mrs. Frank Leslie's *Popular Monthly* has just been issued and, among many other valuable features, contains an attractively illustrated article relating to the visit last January of the delegates of the International League of Press Clubs to San Francisco. Mrs. Frank Leslie, who accompanied the party, is the author of the article, and her account of the trip is quite entertaining and a valuable and interesting addition to the history of the notable event. In the same issue Mrs. Leslie pays a high tribute to the decennial number of the ELECTRICAL REVIEW, which journal she acknowledges (as do all other intelligent people) as the standard electrical publication of this country, and takes occasion to compliment in a discriminating way the great science which is represented by the REVIEW.

The International League of Press Clubs.

The demand for credential cards from members of Press Clubs belonging to the League is quite large, the secretary issuing a number every week. Applications are made by the secretaries of the different Clubs for individual members, who find the cards of value in every city visited that possesses a League Club.

Mrs. Frank Leslie illustrates, in her *Popular Monthly* for May, many of the scenes of interest visited by the delegates to the recent San Francisco Convention. California is particularly favored in this issue.

The eastern delegates to the San Francisco Convention, representing quite generally the press east of the Mississippi, are still talking and writing about the splendid treatment given them by the Californians, and are constant and eloquent in their praise of the numberless advantages of this far western State—advantages that the East but dimly, as yet, realizes.

The historian of the San Francisco trip, Major T. P. McElrath, of New York, is getting together photographs of scenes of interest along the route and in California. It is desired also to have contained in the work pictures of every member of the party, and the early publication of the history will be greatly aided by the prompt forwarding of photographs. Major McElrath kept a very complete diary and in addition is securing valuable and interesting accounts from the various passengers. The matter of publication depends entirely on the travelers, and if they respond promptly with sufficient orders to warrant the publication, it will be issued in good style and as soon as possible.

The next meeting of the Governing Board of the League will be held in Chicago, October 11. The day following will witness in that city the official ceremonies in celebration of the four hundredth anniversary of the discovery of America by Columbus, and this will, no doubt, be attended by all the newspaper people at the Board meeting.

New copies of the constitution and by-laws of the League, with an account of the San Francisco Convention, are now being sent to the Clubs in the League. The pamphlet contains, in addition, abstracts of the addresses and letters from prominent newspaper men and women that were delivered and read during the Convention.

The success of the League has caused much interest in the organization of Press Clubs, and it is likely that several new associations will be formed during the present year. This is one of the many direct advantages of the League, and it is a pleasure to note this increase of interest on the part of the workers of the press generally.

Miss Kate Field's diary account of the San Francisco trip is now appearing in her *Washington*, and is bright and entertaining.

The Edison Triple Expansion Engine and Multipolar Generators.

One of the most serious problems that to-day confronts the management of electric illuminating companies in large cities is the cost of the land necessary to accommodate the large station buildings. When land costs $1,000 and upward a foot front, every square foot of ground space that can be saved materially reduces the necessary investment of the company. Recognizing this fact, the Edison General Electric Company have recently brought out a new line of central station units, consisting of two multipolar dynamos coupled direct, one on either side, to a triple expansion engine, and ranging in capacity from 100 to 1,500 indicated horse-power. This combination does away with all belting and counter-shafting, and thus secures an increase of efficiency and a great saving of floor space, two most important factors in central station practice.

The important features of this type of generator are given in the following description, which will undoubtedly prove of interest to central station managers.

The saving of floor space being one of the chief objects, the necessity of coupling the generator directly to the engine naturally suggests itself; but as the armature of the bipolar generator now in general use must, of necessity, be run at a comparatively higher number of revolutions per minute, it is evident that, unless a special engine is employed, another design of generator is called for.

The multipolar generator is peculiarly adapted to this purpose, as it may be designed to generate any desired electrical output, at an armature speed corresponding to that of a slow speed engine. This type presents the additional advantages of requiring but small floor space, of being able to withstand sudden variations of the load, and of carrying heavy loads continuously without danger of overheating.

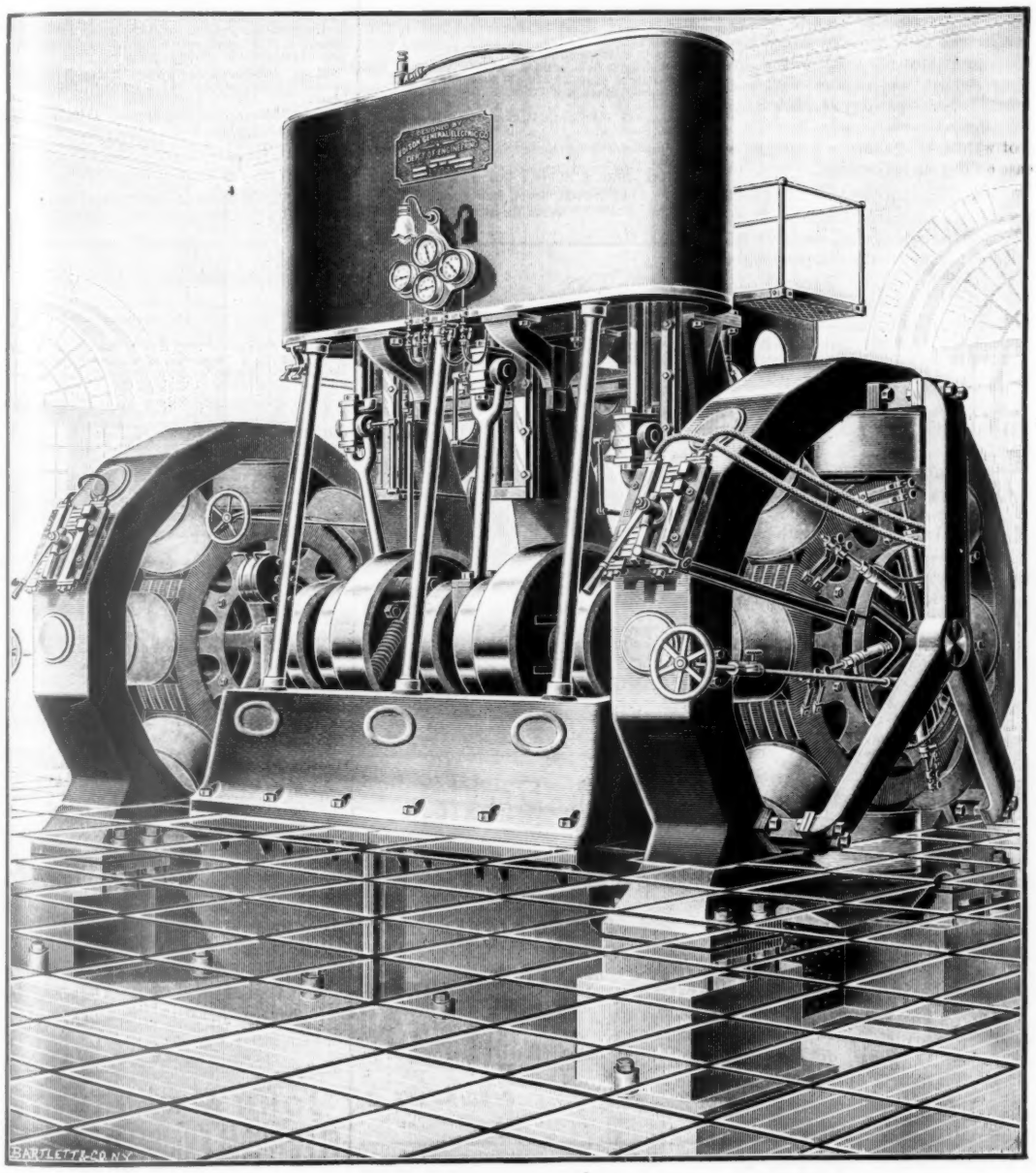
The armature is of the Gramme ring type, of very simple construction; it is built up of ⊏ shaped copper strips, which are slipped (in a single layer) over the laminated wrought iron core, the upper end of one being connected with the lower end of the adjoining loop by a copper bar of corresponding thickness, these bars acting as the segments of the commutator. The number of brushes corresponds to the number of poles of the generator, and it is found that the large current output can be divided among these brushes much more conveniently than if only one set of brushes were used to carry the whole current generated. The mechanical device for controlling these brushes allows of their being operated together, so that, once adjusted, the whole can be handled as though but one set were used.

The field coils are wound on separate spools, which are slipped over the field magnets; these field magnets are then inserted in an annular or polygonal field frame, mounted on the plate of the engine. The bed-plate being heavy and massive, and of special design, perfect alignment and rigidity of the field frame with relation to the engine is secured.

The increased diameter of the armature in the multipolar type of machine gives a very large heat radiating surface. This point, in connection with the special construction outlined above, allows the Edison generators to maintain heavy loads for periods of any duration, a factor that will be admitted as eminently desirable in central stations where such conditions exist.

The armatures are mounted directly on both ends of the crank shaft, and act as the fly wheels of the engine.

The engine is of the triple compound, three crank, inverted cylinder, automatic condensing type, well proportioned throughout, having large wearing surfaces which can be easily adjusted. The bed-plate, to which the main bearing boxes of the crank shaft are cast, is strong and is firmly bolted to a massive foundation box which also carries the dynamo frames—thus perfect rigidity between engine and generators is ensured. The crank shaft is of forged steel, fitted with cast iron balanced discs, to which the crank pins are fitted. There are two bearings to each crank and an additional large bearing on each end of the shaft to carry the armature. On the shaft are three eccentrics, each operated by its own independent governor, so that the point of cut-off in each cylinder is changed equally with the load, thus doing away with any tendency to race, in case the total load is at any time thrown off or any accident happen. Strong cast iron columns carry the cylinders, which are bolted together and the engine made strong, compact and well arranged; indeed, these engines are almost *fac-similes* of the latest and most improved types at present in use on the finest ocean steamships, with necessary additions to render them as highly efficient for electric generating purposes as their prototypes are for marine work. They are calculated for the maximum efficiency point at about 12½ per cent. below the normal maximum capacity of the generator, and have a range to a maximum capacity of 20 per cent. above the normal maximum output of the generator at 160 pounds initial pressure and vacuum of 24″—thus allowing each engine, in case of an accident to the condensing apparatus, to operate the generator satisfactorily non-condensing. In addition to the many advantages already mentioned, these engines, when connected to a suitable condenser, will reduce the consumption of fuel considerably. This is an item of vast importance in electric light stations, increasing their storage, boiler and engine capacity. The compactness of this arrangement, as shown in the following table, prove the advantages to be gained by the use of the dynamos and engine thus combined.



THE EDISON GENERAL ELECTRIC COMPANY'S DIRECT COUPLED GENERATORS AND ENGINE.

Comparative floor space required by two generators and one engine:

TWO BIPOLAR GENERATORS BELTED TO ONE HIGH SPEED ENGINE.

Total Capacity Two Generators.		Minimum Floor Space in Square Feet.
K. W.	16 c. p. lamps.	
50	900	270
90	1,620	374
200	3,600	511
350	6,300	571

TWO MULTIPOLAR GENERATORS COUPLED DIRECT TO ONE EDISON TRIPLE EXPANSION ENGINE.

Total Capacity Two Generators.		Minimum Floor Space in Square Feet.
K. W.	16 c. p. lamps.	
50	900	56
100	1,800	121
200	3,600	180
400	7,200	356

ELECTRIC LIGHT NEWS

—— Carrollton, Ky., is figuring on an electric light plant, and another plant will probably be put in at Bowling Green for private consumers.

—— A large force of men is at work upon the electric lighting plant at Manchester, Mich., and it is expected that the lights will go a-glimmering May 15.

—— The Alexandria Bay, N. Y., Electric Light Company are contemplating putting in a larger dynamo, the one in use not being large enough to supply the demand for Summer use.

—— The electric lighting plant of the Long Island Railroad, at Long Island City, was destroyed by fire last week. Both the Edison incandescent and arc dynamos were melted out of shape.

—— The Mather Electric Company, of Manchester, Conn., is filling an order for an electric light plant of 1,000 horse-power for a large Milwaukee brewery. The plant includes six immense generators of 150 horse-power each, the largest ever built by the company. Each machine will weigh 18,000 pounds.

—— The Malden, Mass., Electric Company has purchased ground and will erect a duplicate electric lighting plant at a cost of about $50,000. The lot purchased contains 10,000 square feet. The two plants will be separated by a fire-proof partition. When the new station is completed, a day power and lighting service will be given.

—— The Citizens' Lighting Company, of Far Rockaway, N. Y., which was recently organized with $25,000 capital, has elected the following board of directors to serve until March 1, 1893: Thomas Henderson, president; James Caffery, vice-president; S. N. Decker, secretary; D. H. Jennings, treasurer; Fred. L. Richmond, S. B. Althause, Jr., Newman J. Pettit, D. L. Starks, Edward Roche, Joseph Biglin and Richard L. Gipson.

KINDRED INTERESTS

The Industrial Improvement Company, Boston, Mass., have ordered a 300 horse-power Ball cross compound engine from the Ball Engine Company, Erie, Pa.

A. Aller, 109 Liberty street, New York, has issued a neat pocket size pamphlet descriptive of engineering specialties for steam, water, gas, oil and chemical apparatus. The Korting injectors are especially prominent.

The Metropolitan Electrical Corporation has recently organized in Kansas City, Mo., to do a general electrical engineering business throughout the West. Thos. F. Clobesy is the president of the corporation.

The Storage Battery Supply Company, 120 Broadway, this city, sole agents for the Consolidated Electric Storage Company, will remove its factory from 158 West Twenty-seventh street to Twenty-third street and First avenue.

Queen & Company.—We are informed by Queen & Company, Philadelphia, that they have recently received an order for more than 200 magnetic vane volt and ampere meters, from a large manufacturing concern, which instruments are to be installed with the light and power plants put up by this company. The transaction is especially satisfactory to the makers, as a sort of competitive examination was instituted and the magnetic vane type was adopted after the most careful comparison with other types.

It has been but a trifle over two years since the Eureka Tempered Copper Company, of North East, Pa., first announced that they were enabled by their process to cast pure copper and harden same so it would be suitable for commutator bars, gear pinions, trolley wheels, etc., yet twice in that time have they been compelled by their largely increasing business to extend their plant, until at the present time they have one of the most complete factories to be found. However, they still find the space inadequate and are contemplating the erection of new offices, store rooms and a rolling mill, during the coming Summer.

The Harrisburg Foundry and Machine Works, Harrisburg, Pa., have received the following orders during the last ten days: Two 10 and 17x14 tandem compound Ideal engines for St. Paul; one 13x12 plain Ideal engine for St. Paul; three 125 horse-power Ideal engines with corresponding steel return tubular boilers, also pump, heater, piping, etc., for Wilkesbarre and Wyoming Valley Traction Company; two 18½x18 plain Ideal engines for New York city; one 13x18 standard Ide engine for Boston; one 125 horse-power Ideal engine, steel return tubular boiler, heater, piping, etc., for Georgetown and Tenallytown Electric Railway, Washington; two steel return tubular boilers for the Allentown Electric Light Company; one 60 horse-power standard Ide engine and steel return tubular boiler for manufacturing purposes, Newville, Pa.; one 25 horse-power Ideal engine for U. S. Naval Observatory, Washington, D. C.; one 50 horse-power engine and steel return tubular boiler for manufacturing purposes at Newport, Pa. Besides these they have a number of small Ideal engines for New York city; also tanks, filters, accumulators, etc., for ice work and other sheet iron users. Besides these orders they have about an equal amount for the month previous and are running to their fullest capacity, increasing their facilities as rapidly as possible.

The Jeffrey Manufacturing Company, Columbus, Ohio, manufacturers of the Jeffrey electrical coal mining machines, are making great progress in the introduction of their apparatus. They now have 51 electric mining machines in daily use, not including the following recent orders: Second order for one Jeffrey electric mining machine from the Congo Mining Company, Congo, Ohio; third order for one Jeffrey electric mining machine from the Redstone Oil, Coal and Coke Company, Grindstone, Pa.; three orders, first equipment for complete Jeffrey electric coal mining machine plants for the Hocking Valley, briefly described as follows: Two plants each, consisting of boilers, engines, dynamos and all necessary connections to run four Jeffrey electric mining machines, with a daily tonnage capacity of 800 tons; also a third plant complete to run six Jeffrey electric coal mining machines, with a daily tonnage capacity of 1,200 tons.

The Northwest Thomson-Houston Electric Company.

The first annual report of the Northwest Thomson-Houston Electric Company covers the period from June 1, 1891, to March 19, 1892, and in that period the company did a gross business of $1,934,000. The company operates under a Thomson-Houston license in Washington, Oregon, Idaho, Wyoming, Montana, North Dakota, South Dakota, Minnesota and Northern Wisconsin. The main office is at St. Paul, with branches at Portland, Oregon, and Helena, Mont. Two departments are in their infancy, the supplying of electrical apparatus for mining work and long distance transmission of power. The company paid dividends of two per cent. on the preferred stock Dec. 15, 1891, and March 15, 1892, and two per cent. on the common, Jan. 15, 1892, with the same declared payable April 15. The report says: "There is every reason to believe that dividends on both preferred and common stock will be continued at their present rate." The balance sheet March 19, 1892, may be condensed as follows:

ASSETS.		
Franchise		$110,000
Machinery, tools and fixtures		20,958
Plants and railways in progress		128,268
Merchandise on hand and in transit		624,852
Repair department inventory		21,314
Security of other companies	$630,547	
Less allowances for conservatism	284,200	
		346,347
Notes and accounts receivable		917,101
Cash		242,707
Total		$2,411,547
LIABILITIES.		
Common stock		$750,000
Preferred stock		750,000
Notes and accounts payable		635,865
Due T.-H. Co., Boston		42.865
Contingent account		43,427
Surplus, June 1, 1891	$100,601	
Gain, June 1 to March 19	161,261	
Total	$261,862	
Less dividends paid	37,472	
Total	$224,390	
Less added to contingent account	35,000	
		189,390
Total		$2,411,547

IMPORTANT NOTICE.

BOSTON, MASS., April 1st, 1892.

K. W. ROSETTES AND FUSE BLOCKS.

We have this day given to the Bryant Electric Company, of Bridgeport, Conn., an exclusive license under letters patent of the United States, No. 407,077, dated July 16, 1889, and No. 431,062, dated July 1, 1890, to manufacture and sell our well-known K. W. ceiling rosettes and fuse blocks.

Having sustained our suit in the Patent Office we are now instituting suits against all infringers and shall protect our rights to the full extent of the law.

Respectfully,

HERBERT C. WIRT.

(Signed) JAMES S. KIMBALL,

By H. C. WIRT.

THE WORLD'S COLUMBIAN EXPOSITION.

Send 50 cents to Bond & Co., 576 Rookery, Chicago, and you will receive, post-paid, a 400 page advance Guide to the Exposition, with elegant Engravings of the Grounds and Buildings. Portraits of its leading spirits, and a Map of the city of Chicago; all of the Rules governing the Exposition and Exhibitors, and all information which can be given out in advance of its opening. Also, other Engravings and printed information will be sent you as published. It will be a very valuable Book and every person should secure a copy.

THE CLARK COMPANY, NEW YORK, 192 BROADWAY,

Is the ONLY Company in the United States that makes a SPECIALTY of manufacturing

ELECTRIC ARC LIGHTING APPARATUS

FOR EVERY PURPOSE.

MACHINERY IN STOCK.

Engine Lathes, 10 in. x 4 ft.; 11 in. x 5 ft.; 12 in. x 6 ft.; 14 in. x 6 ft.; 16 in. x 6 ft.; 18 in. x 8 ft.; 20 in. x 8 ft., with tapes attachment; 22 in. x 12 ft. and 14 ft.; 24 in. and 26 in. x 16 ft.; 30 in. x 10 ft. and 18 ft.; 36 in. and 38 in. x 20 ft.; 42 in. x 12 ft.; 27 in. x 32 ft.; 88 in. x 31 ft.; 96 in. x 20 ft. Fox Lathes, 13 in. x 5 ft.; 14 in. x 5 ft.; 15 in. x 6 ft.; 18 in. x 6 ft. Turret Lathes, 12 in. x 5 ft.; 14 in. x 5 ft.; 15 in. and 16 in. x 6 ft.; 18 in. x 6 ft.; 36 in. x 8 ft.

Planers, 16 in. x 16 in. x 3 ft.; 20 in. x 20 in. x 4 ft.; 24 in. x 24 in. x 6 ft.; 30 in. x 30 in. x 6 ft.; 36 in. x 36 in. x 10 ft.; 42 in. x 42 in. x 12 ft.; 44 in. x 48 in. x 22 ft.; 60 in. x 49 in. x 24 ft.

Friction Shapers, 15 in.. 16 in., 20 in., 22 in., 32 in.

Crank Shapers, 6 in., 8 in., 10 in., 12 in., 13 in., 16 in., 17 in., 20 in., 24 in., 28 in.

Screw Machines, Nos. 1, 2, 3, 4, with or without Wire Feed.

Screw Machines, Nos. 5, 6, 7, 8, Power Feed.

Presses, Nos. 51, 52, 53, Ferracute; Nos. 1, 2, 3, Stiles & Parker.

5 Lincoln Pattern Millers, No. 2.

Hand Millers, Nos. 1 and 2. 3 Cam Cutters.

Bolt Cutters, ¼ in. to 1 in., ½ in to 2 in.

2 Profiling Machines. 1 36 in. and 48 in. Gear Cutter.

C. D. and E. Horizontal Boring Machine. Newark Machine Tool Co.

Send for List of New and Second-Hand Machinery in Stock.

PRENTISS TOOL & SUPPLY CO., P. O. Box 3362, 115 Liberty Street, New York. 59 South Canal St., Chicago, Ill.

Overloaded and disordered Batteries are a common and painful sight. Why? Because they are not built to work, but to sell. Are you a sufferer? Then substitute the LAW BATTERY and suffer no more.

SOLE MAKERS,

LAW TELEPHONE CO.,

85 John Street,

NEW YORK.

Robb MacKie,

CONSULTING

ELECTRICAL

ENGINEER,

Neave Building,

CINCINNATI, O.

Put up in One Pound Cans.

Price, 70 Cents per Pound.

ALWAYS READY FOR USE.

Every Electric Light Plant Should Have It.

CHAS. A. SCHIEREN & CO.,

Patentees and Sole Manufacturers

Perforated Electric Leather Belting

47 Ferry Street, New York.
119 High Street, Boston.
226 N. Third Street, Phila.
46 S. Canal Street, Chicago.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE ISSUED ON APRIL 12, 1892.

472,524 Motor for propelling cars; Walter L. Davis, Chicago, Ill.

472,529 Insulator support; Dennis Doren, New York, N. Y.

472,579 Electro-magnetic valve controller; Olof E. Lundstedt, Brooklyn, N. Y., assignor, by mesne assignments, to the New York Electrical Device Co., of Virginia.

472,596 Trolley wire clamp; Montraville M. Wood, Chicago, Ill.

472,610 Electric switch. 472,611 Flexible supporting arm for electric lamps; Lucius T. Stanley, Brooklyn, N. Y., assignor to the Cutter Electric and Manufacturing Co., Philadelphia, Pa.

472,617 Method of and apparatus for finding the position of distant objects; Bradley A. Fiske, U. S. Navy.

472,623 Electric lighting system; John M. Lockwood, San Francisco, Cal.

472,628 Dynamo-electric machine; Lazarus S. M. Pyke and Harry T. Barnett, London, England, assignors to said Pyke and Edw. Stephen Harris, same place.

472,634 Bracket for electric heaters; George D. Burton, Boston, Mass., assignor to the Electrical Forging Co., of Maine.

472,643 Electric conductor; William R. Patterson, Chicago, Ill.

472,684 Phonograph; James L. Skillin, New York, N. Y.

472,708 Electric motor or generator; Rudolph M. Hunter, Philadelphia, Pa., assignor to the Thomson-Houston Electric Co., of Connecticut.

472,721 Electric search-light; Barton B. Ward, New York, N. Y., assignor, by mesne assignments, to the Scott Electrical Manufacturing Co., of New Jersey.

472,747 Electric arc lamp; Royal E. Ball, New York, N. Y.

472,756 Overhead trolley carrier; William P. Glenn, Lexington, assignor of one-half to Harry A. Vase, Natick, Mass.

472,772 Circuit for multiple switchboard system of telephone exchanges; John A. Seely, New York, N. Y., and Charles E. Scribner, Chicago, Ill., assignors to the Western Electric Co., Chicago, Ill.

472,784 Safety attachment for overhead electric wires; Charles D. Brown, Minneapolis, Minn.

472,800 472,801 Incandescent electric lamp; Geo. C. Baillard, New York, N. Y.

472,806 Adjustable microphone; Hermann O. Henneberg, Berlin, Germany, assignor to Siemens & Halske, same place.

472,810 Electric railway wire suspension; Alexander Philipsborn and Walter Reichel, Berlin, Germany, assignors to Siemens & Halske, same place.

472,909 Electric elevator; Charles R. Pratt, New York, N. Y.

472,933 Joint for electric conductors; Thomas F. O'Connor, New York, N. Y., assignor to the Standard Underground Cable Co., Pittsburgh, Pa.

472,935 Arc light hanger; Charles A. Pfluger, Chicago, Ill., assignor, by direct and mesne assignments, to the Standard Electric Co., of Illinois.

472,943 Dynamo-electric machine; George E. Dorman, Chicago, Ill., assignor to the Standard Electric Co., of Illinois.

472,951 Postal, date and time stamping machine; Olof E. Lundstedt, Brooklyn, N. Y., assignor to John M. Glover, St. Louis, Mo.

472,953 Trolley wire support; Frank C. Prickett, Kansas City, Kan., assignor of one-half to Frederick W. Bruchmann, same place.

472,956 Canopy telephone exchange switchboard; Charles E. Scribner, Chicago, Ill., assignor to the Western Electric Co., same place.

472,968 Electrical surgical instrument; Stephen R. Bradley, Nyack, N. Y.

DESIGNS.

21,454 21,455 Insulator bracket; Charles Wirt, Chicago, Ill.

JOHN A. BARRETT,

ELECTRICAL ENGINEER & EXPERT,

13 PARK ROW,

Room 28. NEW YORK.

NOTICE TO INVENTORS.

THE ELECTRICAL REVIEW PATENT BUREAU

Is splendidly equipped for transacting patent business—procuring patents in the United States and for all foreign countries, and reporting on infringement, validity, patentability, etc.

It was Established to Supply a Real Want, indicated by numerous inquiries for an attorney familiar with both Patent Office procedure and Electricity.

Its Manager was for many years an examiner in the Electrical Department of the United States Patent Office, and has had a wide experience as an attorney.

If you want Prompt and Efficient Work at moderate rates, write the Patent Bureau when you have need of assistance from a patent attorney.

U. S. and foreign patents secured; caveats, trade-marks, labels, design patents, copyrights. Special searches and reports on validity or infringement necessary in prosecuting or defending patent suits.